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1-2-3 Designer & Lotus Founder Mitch Kapor

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Story on page 32

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STORY ON PAGE 58

LOTUS UPGRADES: WHICH ONE'S FOR YOU?

"Release 3.0 is Lotus's intended 'power' version. But with that power comes the hardware requirement for a 286 or higher machine."

STORY ON PAGE 70

DVORAK'S MAILBOX

"John, Novell is in for some rough times ahead. Everyone is jumping on the LAN Manager bandwagon."

STORY ON PAGE 134

PC WORLD BEST BUY
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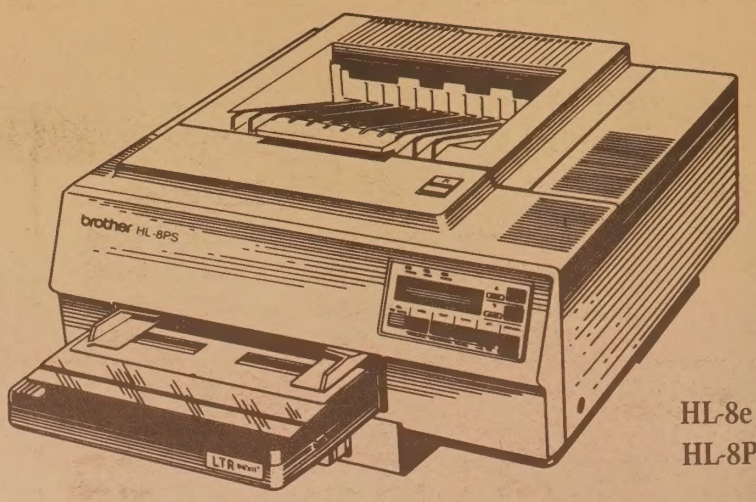

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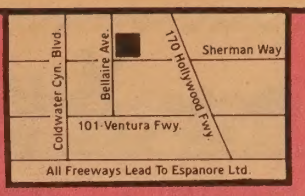

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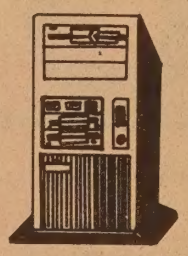

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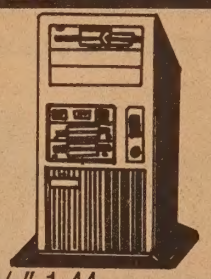

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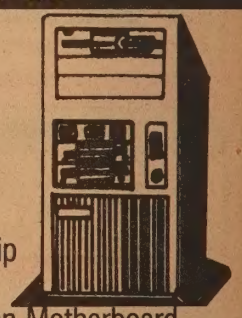

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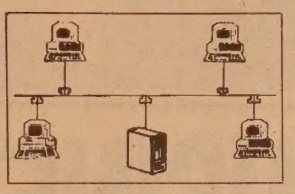

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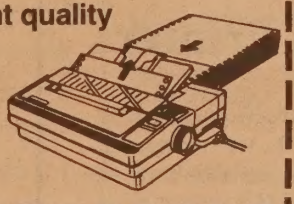

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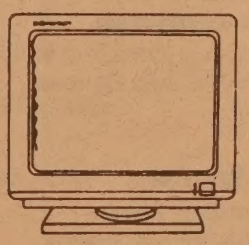

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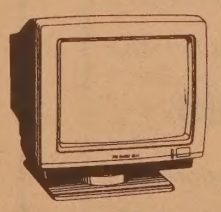

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APRIL 2, 1990 ISSUE #68

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COVER STORY

32

1-2-3 Designer And Lotus Founder Mitch Kapor

On Creativity, Standards, And Building Better Software

By John Perry Barlow

Cover and contents photos: Michael Jay

A freewheeling discussion of the state of the industry, where it's been, where it's going, and how to make it better.

In town for a BMUG presentation, the man whose software changed corporate America is now—among other things—in the business of creating great Macintosh products.

BUSINESS SOLUTIONS

52 **Networking The Mac Office: Sharing A Printer**

By Mary Eisenhart

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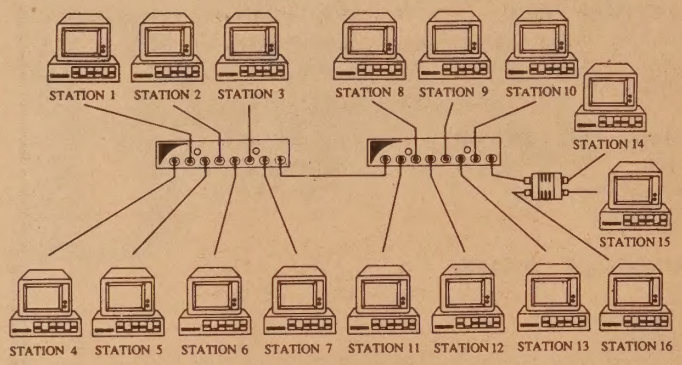

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April 4-6 Fourth Annual Parallel Processing Symposium. Fullerton. IEEE Computer Society. Call: Dr. Larry H. Canter, (714)738-3414.

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April 7 Spring ShareFaire. La Habra MicroLink PC Users Group. Call: Joan, (818)444-5926.

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April 7 Shop Till Ya Drop Computer Swap. Anaheim. Richard James. Call: 1-800-433-7469.

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April 10–13 MacWorld. San Francisco. Call: (415)974-4000.

April 10-12 AEA/AOC Aerospace And Defense Trade Exhibition. Santa Clara. American Electronics Association. Call: Chuck Jungi, (408)987-4204.

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April 11–13 Computer Show For "Businesspeople." Anaheim. SofTrend '90. Call: Melissa Verdugo, (213)831-6000.

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May 6 East-West Computer Show. Ventura. East-West Computer Shows. Call: (415)388-8893.

May 7–9 The Three Rs Of Software Automation: Re-Engineering, Repositories, Reuseability Conference. San Francisco. Extended Intelligence, Inc. Call: (312)642-9080.

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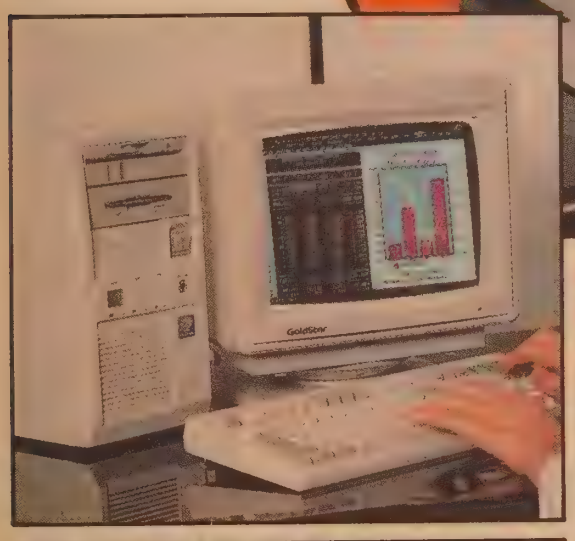

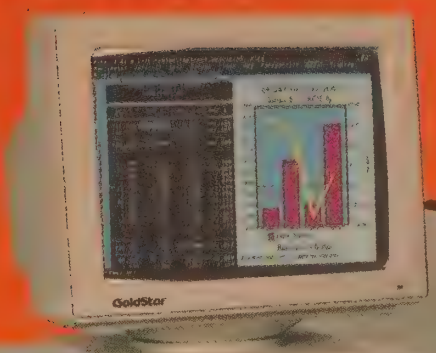

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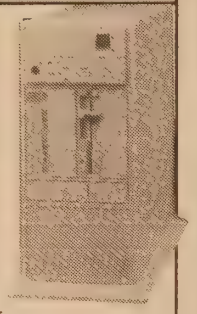

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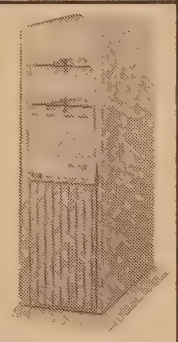

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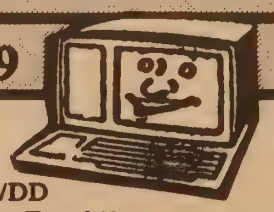

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May 12 Computer Marketplace Show. Costa Mesa. RK Productions. Call: (408)778-5200.

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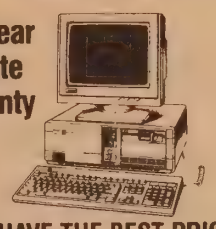

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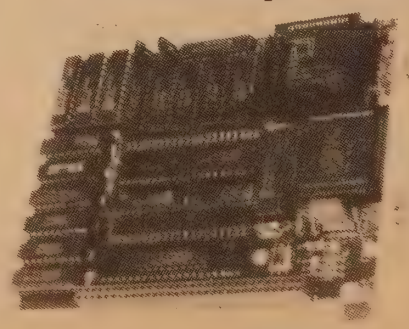

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June 5–8 Hands-on PC Configuration And Troubleshooting Course. San Diego. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

June 5–8 Structured Analysis & Design Methods Course. Los Angeles. Integrated Computer Systems. Call: John Valenti, 1-800-421-8166.

June 9 Computer Marketplace Show. Pomona. Computer Marketplace. Call: Bob Krushner, (408)778-5200.

June 11–13 1990 Nantucket Developer Conference. Palm Desert Dimensions, Inc. Call: 1-800-247-4481.

June 11–15 8th International Congress Of Cybernetics And Systems Conference. New York. CUNY. Call: Kathy Jaeger, (212)772-5213.

June 11–15 USENIX Technical Conference & Exhibition. Anaheim. USENIX. Call: Spencer W. Thomas, (714)588-8649.

June 16 Computer Marketplace Show. Long Beach. RK Productions. Call: 1-800-252-7927.

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continued on page 124

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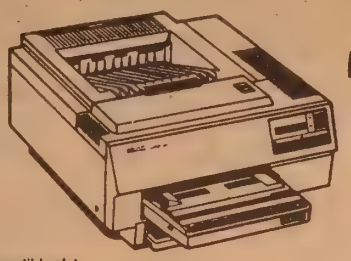

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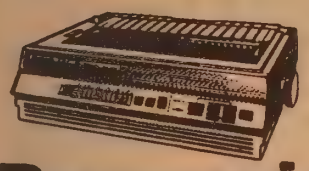

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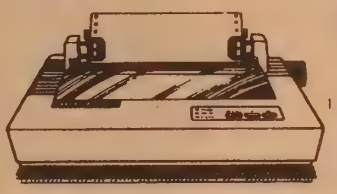

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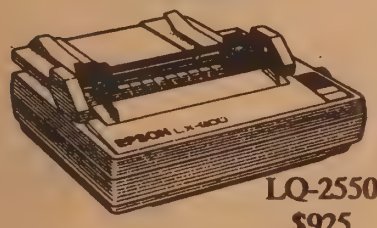

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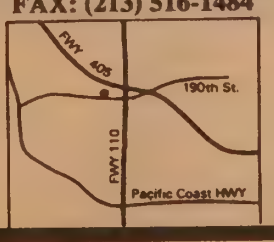

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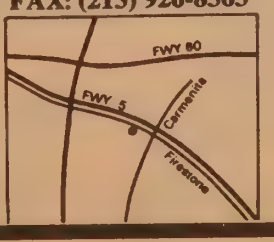

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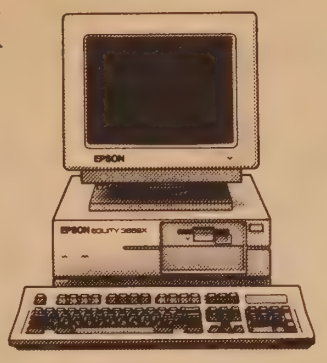

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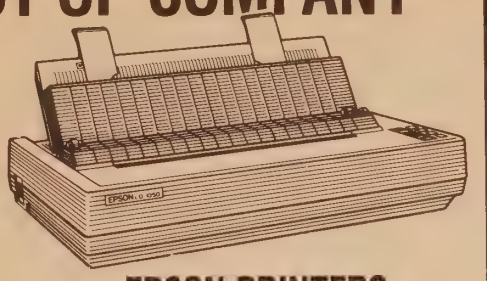

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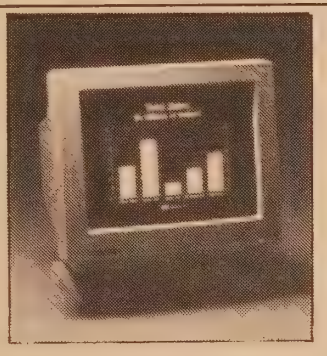

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NEWS AND ANALYSIS

BY PAUL HOFFMAN

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Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on USENET (phoffman@well) and MCI Mail (264-3171). He also writes popular microcomputer books.

Intel Runs Short Of 80386 CPU Chips

Having a monopoly in a market rarely makes you popular. Intel is beginning to discover that its monopoly position in the MS-DOS compatible CPU market can get people angry.

In the last few months, Intel has become unable to ship as many 80386 CPUs as have been demanded by the marketplace. So far, major computer manufacturers who deal directly with Intel have been unaffected by the shortfall, but smaller computer companies have seen the costs on the chips skyrocket.

Intel ascribes the shortfall to higher-than-expected demand, a euphemism for bad planning. Over the last year, Intel has made a concerted effort to get people to switch from 80286-based systems to 80386-based systems, and they must have had some idea of the results of the campaign. Many security analysts assume that the shortage is a good method for Intel to raise prices, or at least not drop them as quickly as they were expected to.

The spot price for 80386 CPUs has doubled in the last three months due to the shortage. Fewer chips are appearing in the market due to Intel's allocating them to system manufacturers before they sell them to chip dealers. Although it is unknown how many chips go to each market, Intel has always said that long-term clients get priority, both on new chips and on chips in short supply.

The companies being hurt the most by the shortage are the small clone sellers. As you can see from perusing the pages of *MicroTimes*, most of these companies live and die on price. Many stores sell fewer than a dozen 80386-based systems a month, although some can sell more than ten times that many if they are large enough and have enough locations. As you can also see, the price difference between the no-name clones and the name-brand 80386 systems is considerable. By squeezing out the low end of the market, Intel is inherently raising the prices on 80386-based systems across the board.

This loss of the low end will, of course, hurt end users quickly. Many companies have been putting off buying an 80386 system until Windows 3 comes out later this year to be sure that any systems that they buy work with Windows 3 immediately. Since Windows is notoriously sensitive to hardware, it could be disastrous to buy a system that may not work with the new version. However, Intel's move may make the wait very costly, especially if the larger companies raise their prices in response to lower competition from below. An even scarier thought is that some large companies might have to raise their prices if Intel cannot make all of its expected deliveries to them. Although none of the major players has said anything about the shortage, if they start getting too few chips in the next few months the certain result will be higher prices.

Intel is preparing for an unfortunate side-effect from the shortage, namely that many people will buy high-end 80286 systems instead of the much more expensive 80386 systems. This, of course, goes directly against what Intel has been trying to persuade people to do for the last year. Every store selling 80386 systems also sells 80286 systems. Intel cannot expect those stores to turn away customers just because their high end is too expensive. Since all major software runs just as well (although slower) on 80286 systems, users will turn to them until the 80386 market drops back to reasonable levels.

Intel ascribes the shortfall to higher-than-expected demand, a euphemism for bad planning.

Small vendors are responding to the problem by hoarding whatever 80386 chips they can get their hands on. Some vendors are also banding together so that they can be large enough to deal directly with Intel instead of having to buy the CPUs from resellers. This is, in effect, turning them into chip wholesalers, one of the most risky businesses within the PC community. However, without chips, these small vendors could easily go out of business.

The shortage also brings up another issue that Intel would like people to forget: second-sourcing. Intel is the only source for 80386 chips. Most other popular CPUs are available from more than one company. If Intel had allowed another company such as AMD to manufacture and sell 80386es, this shortage would never have come up. The danger of single-source chips goes beyond price: if Intel's manufacturing plant was put out of commission by a natural disaster like last year's earthquake, there would simply be no 80386es at all. Of course, Intel has a monopoly on the CPUs and can hold out on second-sourcing as long as it wants. However, if the situation turns significantly worse, there will certainly be an outcry for more freedom in the marketplace.

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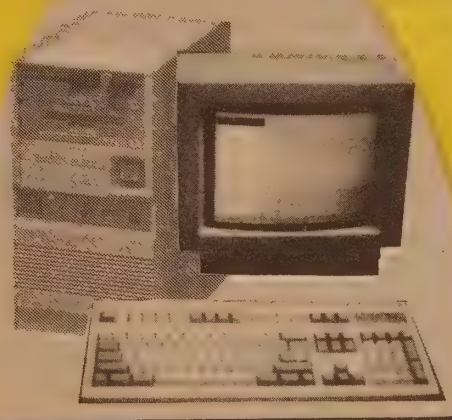

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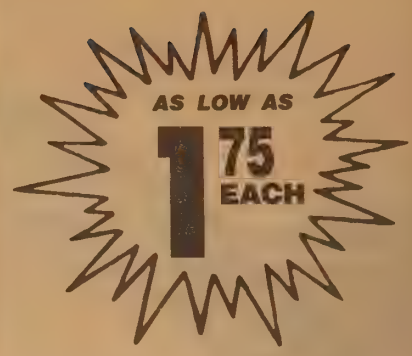

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NEWS AND ANALYSIS

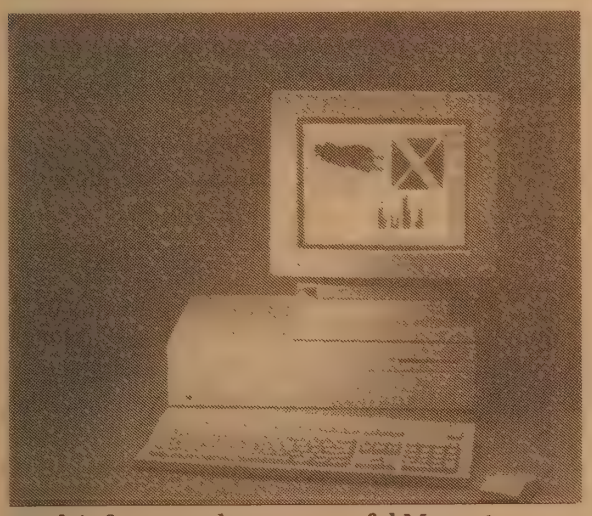
Apple Keeps Its Name In The Newspaper

The last few months have been very busy at Apple. Even standard newspapers have had lots of Apple news almost every week.

Of course, not all this news has been good. Apple's fortunes and woes have become much more interesting to the business community as more Macintoshes are sold into large companies. Apple has also gained respect from many corporations who feel that they are much better able to predict how system software changes on the Mac will affect their work than similar changes on PCs. The recent Apple news:

• Apple cut the prices on the Mac SE line and on the LaserWriter II by 10% to 17%. The net effect was to make the SE family more affordable to students and other entry-level buyers; a market that Apple has courted heavily since the Mac first came out. The price reductions on the LaserWriter IINT and IINTX bring those printers closer to the prices of other PostScript printers, which have been seriously eroding Apple's dominance in the field over the last two years.

• Apple also cut the price on the CD SC CD-ROM player, in this case by 25%. They made this announcement at the CD-ROM conference in San Francisco in February. The new list price is $900,



Apple's fastest and most powerful Mac yet—the IIfx—arrived March 19

which is still quite high relative to the price of CD-ROM players for the PC. To its credit, Apple has pushed CD-ROM technology much further than companies in the PC market. Although everyone is now touting "multimedia" as the wave of the future, Apple began the rallying cry years ago. In addition, it is likely that many multimedia applications will appear first on the Macintosh due to the presence of graphics and sound in the Mac without having to add other hardware, as is required on the PC.

• The perpetual white-male-in-suit parade continued. Allan Loren resigned from the post of President of Apple USA. Loren was blamed for Apple's

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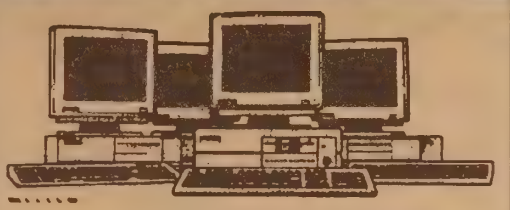
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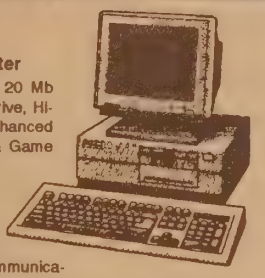
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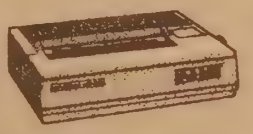
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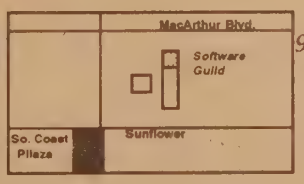

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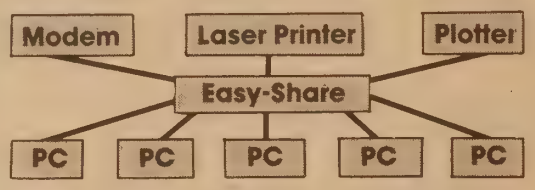

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NEWS AND ANALYSIS

slower-than-expected growth and lack of low-cost products and was clearly pushed out of office. Apple management created a new position, Chief Operating Officer, and gave it to Michael Spindler, previously president of the successful Apple Europe operation. At the same time, Apple took marketing and manufacturing away from Jean-Louis Gassee and put them under Spindler. After a polite wait of a few weeks, Gassee dropped the other shoe and resigned, apparently with Apple's good graces and a promise of good relations in the future. His inbox was immediately flooded with business plans from around the world. The moves gave CEO John Sculley more power and assured investors that Apple's "new" management would be more boring and staid in the future.

• Apple laid off at least 400 workers (3 percent of the company) in order to save money. They also significantly cut the number of contractors working on-site. In a gesture that is rare in Silicon Valley, Apple gave those laid off up to two months of paid time to look for other jobs and even set up a reemployment center to help them find other companies. It is widely expected that if Apple's earnings rise over the next two financial quarters, Apple will refill most of the positions.

•High speed (not low cost) hardware was the order of the day on March 19 when Apple announced many new products. The biggest announcement is the Mac IIfx, Apple's fastest and most feature-laden Mac to date. The IIfx has a 40 MHz 80386 CPU, making it faster than many dedicated UNIX systems. It comes with specialized I/O and memory processors that help boost its speed to twice that of the IIci. Of course, there's a cost for all of this: $8,969 for the lowest-cost configuration. Apple also introduced two video cards, one with a RISC processor to vastly speed up graphic display. The card is approximately ten times as fast for drawing shapes than standard video cards that rely on the Mac's CPU for displaying graphics. Apple also introduced two new standard display cards.

•Apple extended its warranty period from a meager 90 days to a full year. The company has been catching grief from business users for the short warranty, since the AppleCare extended warranty was much more expensive and less convenient than standard PC service contracts. The one-year warranty is retroactive to anyone who bought a Mac since January 1, 1990, and is applied to Macs all over the world.

Font Wars Heat Up: IBM Supports Adobe For Large Systems

An increasingly defensive Adobe Systems garnered IBM's blessing on its font format when IBM announced that it would support Adobe PostScript font technology on larger systems.

Although much of the computer press indicated

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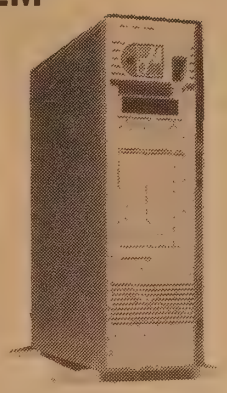

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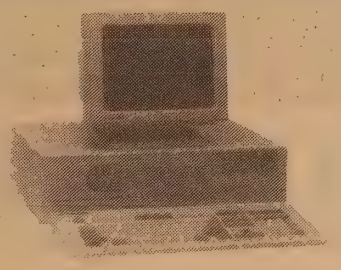

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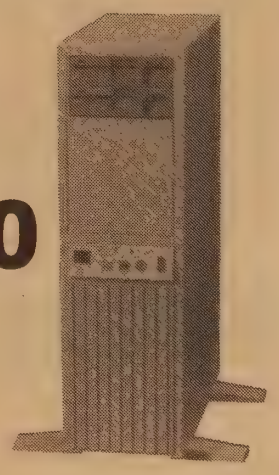

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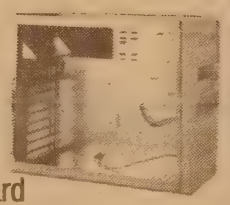

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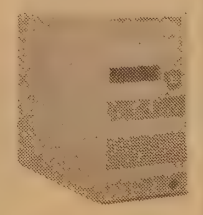

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NEWS AND ANALYSIS

that this was a big victory, few asked at what price and for how many users. In IBM's own words, the announcement only pertains to computers running IBM's SAA platform. Although some high-end PCs will run SAA, the majority of these systems are machines that are used for computing, not printing. IBM said that it would offer both Adobe font technology as well as Apple/Microsoft technology (now called True Type) in its OS/2 systems. This, in effect, says that IBM only believes in Adobe's technology in places where there was no current technical direction.

Adobe apparently gave IBM its font technology extremely cheaply relative to what it charges other manufacturers for licenses to printer and display PostScript. IBM is quite price-sensitive when it comes to per-machine royalties, so it is likely that Adobe let them have the PostScript licenses cheaply in order to get IBM on their side. IBM would not take the last step and exclude other font technology in their IBM-labelled OS/2 systems, especially since Microsoft is working quickly to make True Type portable to its various operating systems and environments, as well as standard for many large software vendors such as WordPerfect and Ashton-Tate.

IBM doesn't really care which technology is used, as long as its customers on each level feel that they can get the best quality easily. No one really expected IBM to abandon PostScript on the few large systems that now support it, and nothing prevents third-party vendors from writing True Type drivers for those systems.

Microsoft Revolutionizes Site Licensing

In a move that will certainly revolutionize the way that large corporations buy software, Microsoft announced "License Paks" for all of its major software.

A License Pak is essentially an empty box you buy for each person at a site who wants to legally use a copy of the software. The box has no disk or documentation: it only has an agreement card you sign and send to Microsoft and a license card you keep with your computer. There is also an order form for software documentation, but it is likely that most people will purchase third-party books instead, since they are less expensive and usually better than the Microsoft manuals.

The License Paks will become popular because they are less expensive than the regular programs. In many companies, a system administrator does all software installation and often training, so Microsoft's disks and manuals were superfluous. Microsoft is specifically encouraging administrators to do all installation over networks or with customized copies, and has promised that future setup programs will make group installation easier. ■

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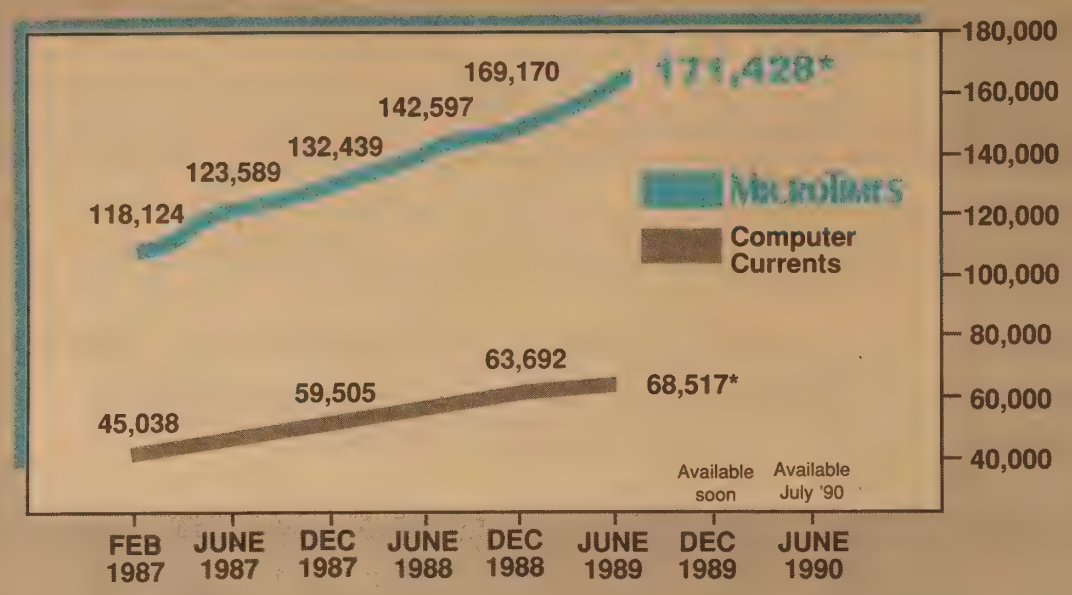

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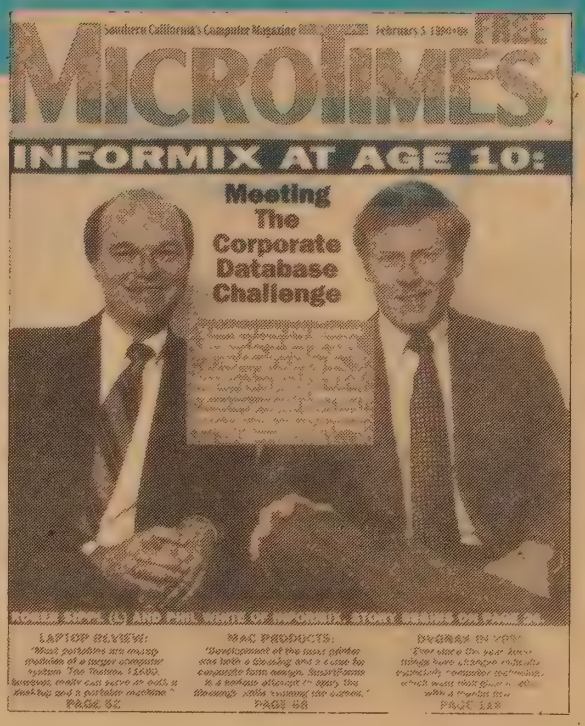

*According to the June, 1989 BPA Audit for both magazines; during the period 1/89 through 6/89, **MicroTimes** delivered, on average, 171,428 qualified copies per issue. Computer Currents distributed an average of only 68,517 qualified copies per issue during the same period: A difference of 102,911 or 150 percent more average qualified copies delivered by **MicroTimes** each issue.

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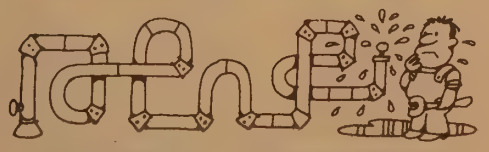

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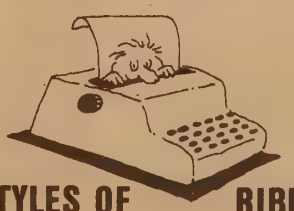

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Let's Have Ergonomically Designed Documentation

Let's hear cheers for functional documentation—that absolutely essential part of computer products, too often tossed into the product package as an also-ran afterthought.

For the moment, consider the physical forms of paper documentation (we'll ignore, for now, esoteric electronic alternatives such as delivering documentation on CD ROM's or in hypertext stacks). Unlike normal books, we need to open documentation to a desired page, lay it on a desk, and have it stay open to that page. We also need to shelve manuals in minimum space, and identify them by reading their spines.

Tiny Books Not A Problem

Except for identification, these "use" issues are generally not of concern when manuals are 30-50 pages or less. They are usually just folded and saddle-stitched (a printer's term for stapling—or sometimes sewing with thread—in the fold). Saddle-stitched booklets are generally obedient to their users, once they're smashed open in the desired position.

The problem comes when documentation exceeds the small page-count that can be saddle-stitched.

Perfect Binding Isn't

Traditionally, paperback books are "perfect-bound"—where small numbers of pages are folded and stitched as above, then stacked together and glued along their spine, with the cover folded around them before the glue dries. (Really cheap ones aren't even folded and stitched; just separate sheets piled together; edge-glued; and thereby "easily removed" upon use.)

They are compact and easily identified on the shelf. However, this form is infuriating when it is used for documentation rather than literature: Either they won't stay open as needed, or they are quickly destroyed as their spine is crushed during irritated use.

The same ergonomic problem exists with hard-bound books. Further, hardbinding is time-consuming, expensive in manufacture and weighty (expensive) in storage and shipment—and guess who pays for it?

Loose-Leaf Binders—Designed For Destruction

Is there anyone who has regularly used reference materials in a three-ring binder who has not accidentally torn pages out? Is there anyone who can keep their reference shelf orderly with a batch of trapezoidal ring-binders leaning drunkenly back and forth? Is there anyone who doesn't begrudge the extra space taken by such ring-bound documentation? (Obviously a computer novice with an inadequate library.)

And, like hardbound books, we pay an unnecessary expense for ring-bound documentation.

Wire-O & Spiral-Bound—Better, But Not Best

Spiral-bound documentation is gloriously obedient when opened to a desired location. With their numerous "rings," only the most vigorous of users can even begin to tear sheets out.

And, surprise!—they're cheap. Friends at Apple tell me that wire-O binding is cost-competitive with perfect-bound books that have first been saddle-stitched (essential for repetitive use!).

("Wire-O" is the variation where the wire circles are parallel, rather than forming a spiral. Most of Apple's Macintosh manuals use this form.) Further, the plastic-ring analog of wire-O can provide very functional documentation in arbitrarily small quantity, using inexpensive desktop manual binder machines, in-house, or through many local printers-for-a-fee.

But the rings tangle and scratch, and their spinelessness makes them anonymous when shelved.

Apple tried solving the identification problem: Their back covers are extra long and can be folded around what is normally the open end of the book, with the title printed thereon. But the wire bindings still scratch and snarl with their shelf companions, and the flap's a hassle (pick, pick, pick!).

Ta Dah! The Solution!

Synergy Software has shown how to do it right: Use the wire-O, plastic version, or even a cheapoid spiral. Then print a single, long cover, with one extra fold, and:

Bind the back edge of the cover to the spiral, as usual. Take it to the outer edge of the back page; fold it back towards the spine; then fold it 90 degrees, twice—wrapping around, covering and shielding the wire-binding, and forming a spine on which the title can be printed; and have its other edge end at the outer edge of the front of the book, just as would a normal front cover. *It works great!*

Stays open wherever desired; no spiral tangles; no scratches; easy identification when shelved; pages don't tear out. Additionally, the extra-long cover provides a large, sturdy area for diagrams or text-spreads that is much more convenient than a normal foldout.

Is there anyone who has regularly used reference materials in a three-ring binder who has not accidentally torn pages out? Is there anyone who can keep their reference shelf orderly with a batch of trapezoidal ring-binders leaning drunkenly back and forth?

Attribution, well-earned (for documentation format and software content): Synergy Software produces megamonster terminal emulation and communications packages for the Mac. Folks, these are no toys; they provide robust simulation of a variety of high-end alphanumeric and graphics terminals (Tek, DEC, etc.) for interaction with mainframes. Buy a Mac and VersaTerm—perhaps for about the cost of high-end graphics terminal—and you have powerful emulation of numerous terminals, plus communications and file-transfer software, plus a Macintosh for *real* computing.

(Synergy also makes what appears to be a potent data analysis and graphing package allowing a Mac to massage and graph mountains of mainframe data, but I haven't yet dug up enough data to really exercise it. (2457 Perkiomen Ave., Reading, PA 19606; 215-779-0522.)

Quicklets

Recently, someone mentioned FORTRAN (is *that* still around?). Programming in FORTRAN is like saying Mass in Latin—but without the beauty.

Could hex cause hackers to be hippies? Must toes be exposed to count in base-16? Perhaps sandals or bare feet are programmers' necessary professional attire. ('Hex' is short for hexadecimal; base-16 numeration.)

Subtitle

Send suggestions to Jim Warren, Realizable Fantasies, 345 Swett Road, Woodside, CA 94062. Published proposals will be attributed to their authors unless anonymity is requested. ■

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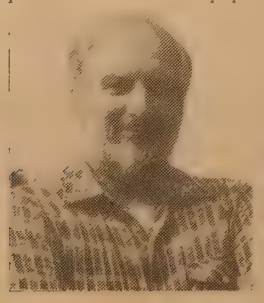

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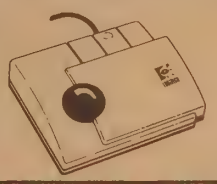

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Lotus Founder And 1-2-3 Designer Mitch Kapor

Interviewed By John Perry Barlow

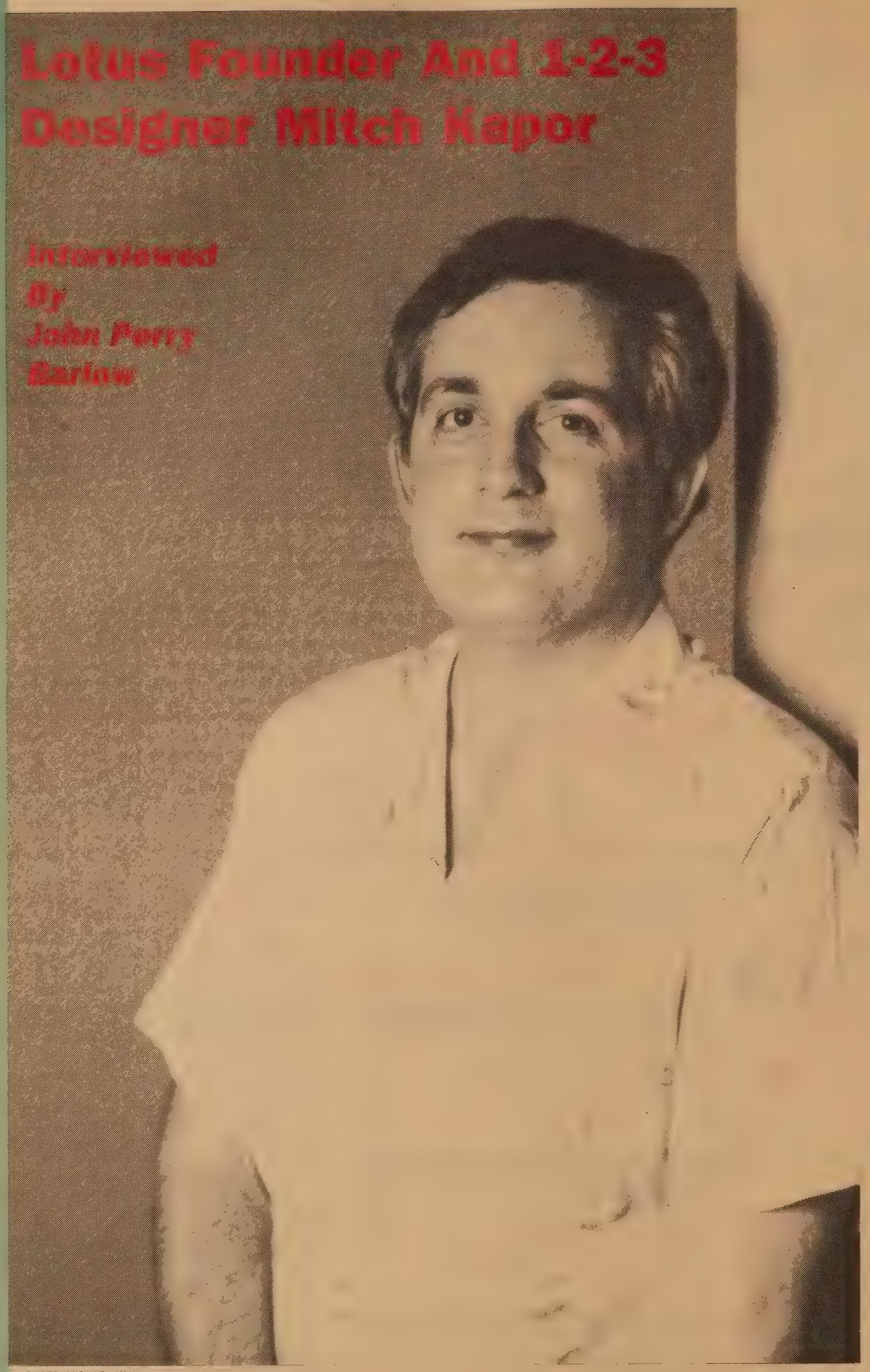

PHOTO: MICHAEL JAY

"When worlds collide!" exclaims Mitch Kapor. Kapor, founder of Lotus Development, designer of 1-2-3, and currently chairman of ON Technology in Cambridge, Massachusetts, is in town to demo his company's new product, ON Location, at the BMUG meeting later in the evening. He is patiently enduring the gazillionth photo shoot of his career when I explain that this interview might be a little *different*. Kapor's being interviewed by Grateful Dead lyricist John Perry Barlow: creator of the cult classic "Salt Lake City," recent narrow escapee from membership in the Wyoming State Senate, and author of the book-in-progress *Everything You Know Is Wrong*, on the American corporation.

Barlow, for his part, immediately produces a tape from God-knows-where. It turns out to be from a 1975 seminar conducted by mind-scholar Gregory Bateson, in which a participant turns out to be one Mitch Kapor. Kapor, in turn, allows as how a journalist in Boston claims to have a tape of his 1978 standup comic routine; the comedy act drew heavily from Kapor's previous job as a counseling psychologist in a mental hospital.

As you may be suspecting by now, what ensues is indeed not your typical company-profile-type interview. It's a sprawling, no-holds-barred look at what's right and wrong with the personal computer industry—as viewed by one of its chief architects and one of its crankier observers. Sacred cows do not fare well.

These days Kapor's projects include ON, which has the self-appointed mission of creating genuinely great Macintosh products, and efforts to focus attention and creativity on the issue of software design. In a recent article in *Scientific American* (March 1990), he main-

On entrepreneurship, creativity, software design, Lotus, Microsoft, standards, virtual reality, and various other matters

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tains that in the quest for ever-more-powerful tools, the issue of making them useful and functional for human users has fallen by the wayside. There's a growing tendency for software products to be engineering-strong and design-weak, with the result that the people who use the products are rarely able to take full advantage of the power they offer; it's Kapor's contention that software needs designers like buildings need architects if the potential of the high-tech revolution is to become reality.

As part of his efforts to gather like-minded people to discuss software design issues, Kapor recently opened the Software Design conference on the WELL, a Sausalito-based conferencing system. It's already attracted a lively group of programmers, engineers, and interested users to discuss the strengths and weaknesses of current products and tackle the issues involved in making it all work better.

We pick up the Kapor-Barlow conversation amid reminiscences of the dawn of personal computing, as Kapor describes his fateful step of buying an Apple II.

—Mary Eisenhart

Mitch Kapor: The Apple II changed my life.

I'd been really interested in personal computers, since I first heard about them. In fact, I was reading Ted Nelson—I bought a first edition of *Computer Lib* back when he was printing them himself, and I still have it. I discovered him just prowling the bookstores in Harvard Square.

So I was kind of waiting for PCs to happen. I was watching the Altair—but I couldn't solder; I'm not a hardware guy. Finally the Apple II came out, and I said, "This is really cool." I was hanging around in stores. I didn't know anybody who actually owned one, but I was reading *Creative Computing*...

John Perry Barlow: So did you teach yourself BASIC?

I knew a little BASIC, because I'd worked for a year or two as a very junior-level programmer in the early '70s.

I drove up to New Hampshire to buy my Apple II because I couldn't afford it with the sales tax in Massachusetts. The most money I'd ever made in a year was $12,000, and that was in a good year. I was unemployed and I thought I was going to go back to graduate school.

So I bought this Apple II because—I didn't know why I was doing it.

Isn't life funny?

Yeah, but what happened was even funnier. The day after I bought it I was hanging out in a different computer store, and I saw this affluent-looking guy in his forties in this nice suit buying one. I was kind of eavesdropping on the conversation, and it turns out he was an opthamologist, and he was buying a toy, and he didn't know *anything*. I'd already had my machine for a day...

So you were a computer consultant! (cracks up)

I did! I sold myself to him as a consultant! I don't know where I got the nerve to do this, because this is totally uncharacteristic for me.

So for five bucks an hour he hired me on as his BASIC programmer. That's actually how I got started, and I supported myself on that, and I became the first, as far as I know, microcomputer consultant in the Boston area. This was 1978; it was the month Apple shipped their disk drive, so it was still pretty early.

I got a few more consulting clients and started the first Apple users' group east of the Mississippi with a few other people. And that's how I got into PCs—never looked back.

Did Lotus actually develop any software for the Apple II?

Yes. It's a little-known fact that it did. It was a product called Executive Briefing System, which was like a very early predecessor to More or Persuasion or those kinds of things, but on an Apple II.

I wrote a product called VisiPlot before that. Personal Software was the publisher. Software Arts did VisiCalc, and my little company, Micro Finance Systems, did VisiPlot and VisiTrend in a publishing arrangement with Personal Software. So we were like sister companies, Dan Bricklin's company and mine.

VisiPlot was a standalone program that did graphing and was a complete thing unto itself. You could enter data and it would draw different kinds of charts on it.

Could you use it in conjunction with VisiCalc?

They invented something called DIF, Data Interchange Format, which I worked on the design of. The idea for DIF was to make sure that you could exchange data between the two programs. You could make graphs from your spreadsheet.

I arranged for Personal Software to buy out my royalty stream after the product came out, because I was unhappy with the relationship and didn't think that it was going to come to any good end. I took some of that money and started what eventually became Lotus. It was Lotus Development Company for about six or eight months, and we did this thing called Executive Briefing System for the Apple II during that phase.

But when I got venture capital, Ben Rosen and the other people looked at what we were doing and said "We don't think you should be doing this Apple II stuff, it's just tiny compared to the opportunity to do 1-2-3." So we wound up that activity.

I've always been a little curious about the way Software Arts got subsumed.

Well... It was the coda to a tragedy.

Was there ill will?

Not with me.

There was this publishing relationship—Dan Fijlstra had this company out here called Personal Software that later changed its name to VisiCorp. They were the publisher, and Software Arts was the developer. When they signed the original contract, they agreed upon a 35.7% royalty rate, which turned out to be absurdly high given the economics. Nobody really understood the economics of it, and it was uneconomic for personal software to do that.

So they had this situation where the product was selling incredibly well, but there was an inequitable contract. They wound up basically committing mutual suicide, because they could not find a way to disentangle themselves from this bad relationship. There were accusations going back and forth, and a lot of ego.

I was a third party to this. My contract was very similar, but VisiPlot was maybe selling one-fifth to one-tenth as much as VisiCalc.

See, from the Software Arts guys' side, they were raking in a lot of money and it was all pure profit, so they were not very happy about giving some of it up. From Personal Software's point of view, they couldn't afford to keep doing this. What they should've done is gotten a divorce. As painful as it would've been, and as much of a perceived sacrifice as it would've been for each party, they should've said "Hey, in the long run we're both going to be better off if we can find some way to split up."

They didn't do that, and I could see that that probably wasn't going to happen. I started Lotus on the premise that there was going to be a big market for a next-generation spreadsheet that was fast and user-programmable and could use a lot of memory. I offered the idea to both parties, and neither was interested in it.

So you basically designed Lotus 1-2-3 personally?

Yes.

Jon Sachs and I teamed up, and he wrote all the code. He had written a spreadsheet for the Data General minicomputer, and he'd been in a partnership that hadn't worked out well. So when he and I started working together, he had rights to this

"I drove up to New Hampshire to buy my Apple II because I couldn't afford it with the sales tax in Massachusetts. The most money I'd ever made in a year was $12,000, and that was in a good year. I was unemployed and I thought I was going to go back to graduate school."

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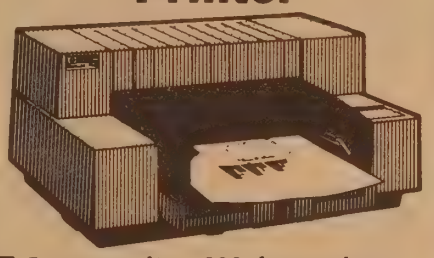

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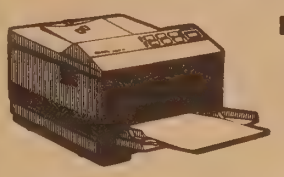

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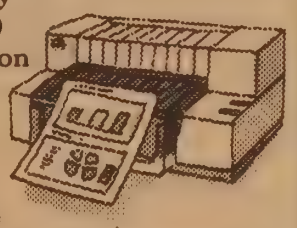

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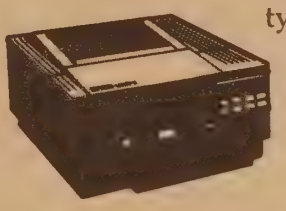

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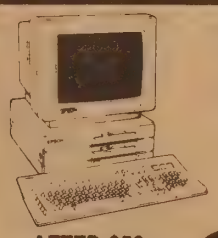

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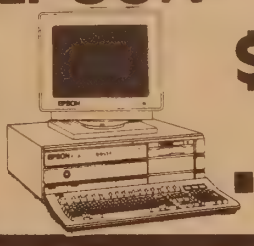

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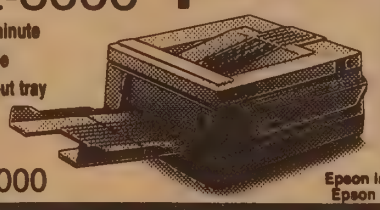

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thing that he'd done. It was written in whatever the proprietary language was on this minicomputer.

So the first thing he set out to do was rewrite it, just to get it into an environment where we could work with it. He rewrote it in C for a 64 K Z-80 machine. This was in the beginning of the summer of '81.

But in the summer of '81 the IBM PC was announced, and that really changed our thinking a lot. I thought we should make that the target environment. It had a 16 bit processor, 640 K, faster, bigger. And I thought IBM was going against their whole tradition, breaking tradition, which I liked, and saying, "Well, we'll go through ComputerLand and Sears. We won't sell it ourselves. We'll use outside software because we don't know how to build software for this thing..."

And I said, "Gee, somebody at Armonk must know something."

Turns out it was somebody in Boca Raton that knew something...

With a godfather in Armonk named Paul Rizzo, who many times prevented it from being killed.

IBM was the golden name in corporate America, and I could see where this thing was going, so I said, "Why don't we bet on that?"

The problem was, we knew that writing it in C wasn't going to cut it because it was too slow, so we had to write it in assembly language. If you can believe this, there was no assembler available for the IBM PC until January '82. We had about five months where we really couldn't do any development, so we did a lot of design work. Sachs kept working on the Z-80 version, and the day we got the assembler he went off and started re-implementing the spreadsheet for the sixth time.

When you were designing the interface, that was as much your doing as anybody's?

It's funny, I just had to go through reconstructing exactly what happened when because I was testifying in a lawsuit.

A look-and-feel lawsuit?

Yeah, I was called in as a fact witness, because the defendants were claiming, among other things, that there's no originality in 1-2-3, that it was really just a knockoff of VisiCalc.

Well, it turns out that I'd saved all of my notes—I was quite compulsive about keeping a full written record. All that stuff got carted off in boxes to the attorneys three years ago when the suit was filed by Lotus—which was after I was no longer there full-time, but I was still on the board.

In the course of preparing for this, I went through the hundreds of pages of my original notes, and I created this affidavit which is available now, I guess, as part of the public record. So I'm now more refreshed about who did what.

The basic concept of doing a fast, programmable, with-macros, spreadsheet with graphing was my concept. Most of the feature design was mine, although Jon did a bunch of working out the graphing functionality.

We didn't agree on the menu until the very end. We had about 48 different abortive attempts to come up with a menu, and finally Sachs said, "Look, let's build the functionality in and worry about the menu at the end." We really did the menu of it by committee—I was the chairman of it, but by that time we had five or six people figuring out how we were going to group the commands. We tried a whole bunch of different alternatives until we found something that we liked.

It must have been something of a gamble to want to put graphics in that program at that point, though. It seems to me that it was a long time before you saw very many graphic monitors for PCs.

Well, I don't know. Because I had done VisiPlot, it seemed like a complete no-brainer.

That's where the actual idea for the product came to me originally—I was sitting there in VisiCalc, with a spreadsheet. I think I was trying to calculate my future royalties (laughs), because VisiPlot hadn't shipped yet.

I wanted to make a graph. There was a way of doing it using DIF, but it was unbelievably cumbersome, because you'd have to go through and mark out a range, and then save it to disk, quit out of VisiCalc, *reboot your machine*—because VisCalc was copy protected and when you quit they wouldn't let you quit to the operating system. You actually had to reboot, startup, fire up VisiPlot, load it all in, open up the file, load it in, specify the graph—it took five minutes.

I said, "There's got to be a better way. I've got the numbers right here—why isn't there a Graph command?" That's when I had some discussions both with Bricklin and the people at Personal Software about this, and I guess they felt that I was trying to encroach on their thing.

IBM had this stupid solution originally—you either had a monochrome monitor with no graphics, or very low quality graphics. And Hercules came out with this thing that did both.

And Compaq. When I first got a copy of Lotus, I had a Compaq portable, and to me it was the only machine that would run Lotus right.

Yeah, I think in a small way 1-2-3 may have sounded the death knell for the character-only video display.

You have an interesting quote in Scientific American (March 1990): "The problem of making computers useful to people as communications and information devices is not an engineering problem, it's a design problem. Engineers are trained to eliminate the subjective factors, but it's exactly the subjective factors that are critical here."

That just seemed like a very important thing to say. I thought it was good coming from you, because there's an irony here in the sense that Lotus, I think, has hung up interface design in a way. Would you agree that that's true?

I think so.

There is, in business, an addiction to Lotus that has made it very difficult for people to move on to the next step.

There are a lot of reasons why people haven't moved on to the next step. That's true, but I'm not sure which direction the causality flows.

I don't think you can get people to switch away from Microsoft Word for the Mac any more easily than you can get them to switch from 1-2-3. It's a fact that whatever establishes itself first as the standard, and also whatever can't really be improved on for a given quantum of computing power, sort of tends to drag everything down.

In the issue of Scientific American right before this one, the economist talks about positive feedback modeling, in which he says basically that it's against the laws of classical economics, but now you have positive feedback loops where the first product, if it establishes a clear lead in the beginning, is a strange attractor.

Well, if there's something with enough energy to essentially push the electron to the next orbit out, it has to have critical mass. It's typically like bumping up to the next platform. So if and when OS/2-PM ever becomes, if not the dominant OS, a major player, you'll be able to do things with that that you just plain can't do now, and someone'll figure out how to take advantage of that.

But even that might not be enough. We're still using the Scholl's keyboard on the typewriter.

To put the design thing in perspective, I think when I was doing 1-2-3 I was designing software, and I knew I was designing software, but I didn't think of myself as a software designer. Mostly I just felt awkward and out of place, because all of the other technical people who were making contributions were these people who did very heavy programming.

You've got to remember, Bill Gates got started by writing Altair BASIC;

"When I got venture capital, Ben Rosen and the other people looked at what we were doing and said, 'We don't think you should be doing this Apple II stuff, it's just tiny compared to the opportunity to do 1-2-3.' So we wound up that activity."

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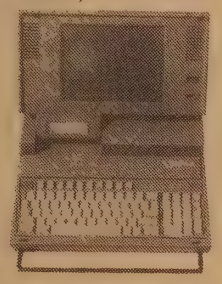

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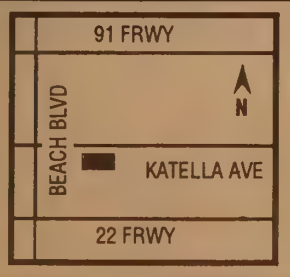

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he was in there with the bits and the bytes. Bricklin did a lot of very heavy duty technical stuff, and so on down the line. So I thought that somehow I was a second-class citizen, because I couldn't write code the way they could write code.

But Gates turns out to be the exception in this business. The code writers very rarely maintain control of their companies.

Well, they turn out not to be the entrepreneurs, but at that time nobody knew that.

So I just felt weird about it, and left out, and kind of the outsider. It was only in thinking about it over the next seven or eight years that I finally came to the conclusion recently that there is this other professional role called software designer that we just haven't gotten around to recognizing and making legitimate.

But if you look at other things like industrial design and graphics design, what architects do for buildings, software designers should do for software. It's just a mark of the relative youth and immaturity of the software business that it hasn't happened. So I said, "Oh, okay, that's what I am. I bet there are other people like that. Why don't we spend some time thinking about what we ought to do with ourselves?"

So that's the idea for the talks I've been giving, and for this [WELL] conference. The conference has several goals. One is to serve as a forum for ideas where people can talk about this stuff and bounce ideas off each other, try to identify what are some of the major issues having to do with the identity of the field, how design is related to programming, and so on.

The second thing is as a kind of opportunity for people who are designers to meet each other, to kind of come out of the closet, to do some networking, some consciousness-raising, really.

And then the third thing is to eventually do some kind of organizing. I don't know what that's going to be; ultimately it might be some sort of professional society. But I think there's some very practical issues. If you want to do good programming, there are millions of books to read, there are courses to take, there are role models to follow. There's 40 million magazines to read, and things like that.

If you're a designer, there's no institutionalized stuff. There's no workshops, no conferences, no periodicals. Everything happens very informally, and I think the whole process and the software that gets made could benefit from some conscious attention to this stuff. I'd like to see, over a period of years, courses, books, training, ways that people who want to actually design things can learn how to do that in a less haphazard fashion.

There's a lot of work to be done there, and it's not just in computers. You look at the interfaces you have to deal with in every element of your life. It takes a rocket scientist to deal with a VCR at this point.

That's one of my favorite points in the talks that I give—if you think computers are bad, look at consumer electronics. Everybody has a VCR, and half of them just blink "12:00" "12:00" because nobody can figure out how to set the clock.

The reason consumer electronics are even worse than computers has to do with the fact that PCs have open architectures and consumer electronics have closed boxes. What that means is that if I can figure out how to make a computer easier to use, in the course of doing something, I can start a software company. And maybe it succeeds and maybe it doesn't, but at least I have the opportunity to do that.

So what we've seen is tens of thousands of people start software companies, and there's a very harsh Darwinian evolution. Most of them fail because their ideas and their execution are not sufficiently well-received, so they die out. But a few things succeed, and those are the ones that are imitated very broadly. And so by virtue of all of this effort that's taking place in the market, the platform provider, like an Apple or an IBM or whoever, doesn't have to worry. They don't have to do the R&D to figure out how to make this stuff easy to use; they let the market do it, because the interfaces are all public. You buy the book, you write your product, and you sell it, and a few good ones succeed.

With VCRs, suppose I can figure out how to make it easy to program. It's a closed box. The bus is closed, there's no software— I can't make a product. What they ought to do is what Apple did in '78, which is to open up the interface. It's to say, here's the manual, here's the bus, here are pinouts, here's the API, go for it.

The brilliant social invention of the PC industry is the fact that you get this sort of market-mediated innovation where you let market forces, inefficient though they are, sort of propel the whole mass forward. You rely less on a few firms.

There are two big sources for the PC revolution. One is all the stuff that went on with Xerox and DARPA funding and timesharing and all of that. The other is the hackers, the Homebrew Computer Club—the hippies. It was the hippies that made open architecture. In the old days, somebody went through Steve Wozniak's desk drawers in 1978, Xeroxed all this unreleased documentation, and sent it out to everybody. That was the real beginning of open architecture—this is not something that was thought up at DARPA or Xerox PARC.

So I say, give the hippies credit. Because it's now the accepted way that things are done.

You were basically proposing that success in the computer or software business had to do with being right, and I wonder if luck isn't a bigger factor.

I think it's 10 or 20 percent being right, and 70 to 80 percent Other. The correlation of justice and success is a small positive number.

About like it is in the music business, it looks like.

It seems like it's really difficult for those really creative people to come on and do it again. Gates's success is not based on his creative abilities.

No, being successful has to do with knowing how to build and run a big business, which is an art form of its own, but it's different from making great products. This really bothers me, because what I like is great products that make a difference in people's lives.

But if I force myself to be intellectually honest, I would have to say that if I really wanted to build a big business, I wouldn't pay so much attention to making great products. I'd make okay products, and I would take the additional time and energy that would be freed up—because it's really hard to make great products—into building a big business. But that's not me.

To build a really big business, you need to make this your first and foremost goal, not making terrific products. It's not that the two are totally incompatible. Obviously, that's not so. What is so is that in a world of limited resources, you're constantly faced with choices about where to put the extra ounce of effort. In Microsoft's case, as I see it, the extra effort goes into extremely aggressive competitive moves that really have everything to do with benefiting Microsoft and very little to do with benefiting the customer.

Right now, I think we're seeing in Microsoft the creation of a great post-industrial empire comparable to the creation of Standard Oil in the nineteenth century, and when people write the books about what was going on in the 1980s and the 1990s in the economy, they're going to wind up writing about Microsoft and how Bill managed the IBM relationship so well that he held a $60 billion company hostage for a decade.

It's all quite brilliant, but it bothers me, because I think that product quality and the net benefit to users could be much, much greater if Microsoft were more sensitive to user needs.

For a while I kept wanting to attribute malicious motives to Microsoft and Gates, and if I were to be intellectually honest, I found that I just couldn't do it. But ultimately I'm not

"If you can believe this, there was no assembler available for the IBM PC until January '82. We had about five months where we really couldn't do any development on 1-2-3, so we did a lot of design work."

"The brilliant social invention of the PC industry is the fact that you get this market-mediated innovation where you let market forces, inefficient though they are, propel the whole mass forward. You rely less on a few firms."

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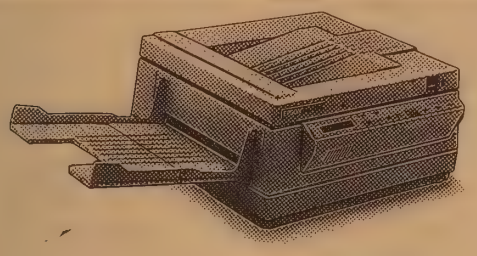

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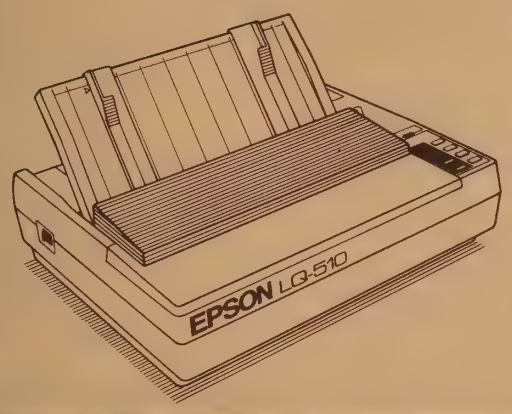

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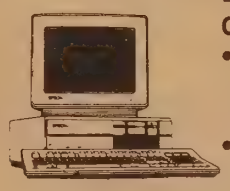

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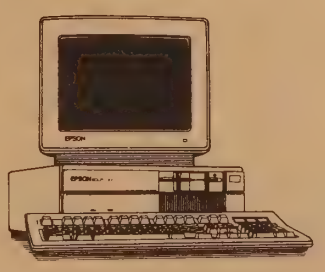

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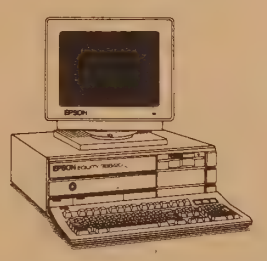

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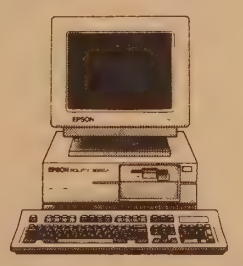

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sure that motivation counts for much in and of itself as much as in the results it produces. And if people are intimidated and frustrated by computers, which means in today's world frustrated by Microsoft's pervasive operating systems, then it would be good if Microsoft—and for the sake of completeness AT&T and Sun and the other UNIX providers and so on—expanded their sense of responsibility to take into account more of the well-being of the ultimate end-user population. At least, that's what I would do if I were running the company. It might mean giving up some of the aspiration to dominate every market segment, but I think I could live with it.

I keep wanting to use something besides Microsoft Word. And I can't. When I was on the PC I looked at WordPerfect, which is a truly horrible program—I mean, the only reason it's successful is that they've got 150 good Mormon girls in Orem who'll talk to you all day long. For nothing.

(Laughs) That's not the only reason. They've done a terrific job of understanding that the marketplace really wants service and they want certain kinds of consistency and product quality after a point. Good enough is good enough sometimes.

As much as I resent how Microsoft came to be what it is, which is really a deal with the devil in a way—Gates bought that operating system from his old chum, whose name evades me at the moment...

The guy from Seattle Computer Society, for $40,000.

Gates knew what the deal was. He didn't.

True, but you've got to understand that had he not been able to buy that, he would've done something else. He's very resourceful. A lot of this is just pure will to succeed.

But would you like to be in the kind of position at Lotus that Bill Gates is in at Microsoft?

Well, it was at the point where I realized that that wasn't going to happen that I crossed over the threshold of not wanting to be there.

The difference was that Lotus is grounded by owning the spreadsheet franchise. Which is great if you want to build a billion-dollar business, which they're now in the process of doing. But they cannot affect events in the computer industry, because they don't control a deep platform.

They understand a lot about customers and they control this enormous segment of customers, but if you want to have impact, one way to do that is by controlling system software/hardware. It became apparent to me that that was the right play, and that Microsoft had that, and there was no way Lotus was going to do it. There was just no way it was going to happen.

"If I really wanted to build a big business, I wouldn't pay so much attention to making great products. I'd make okay products, and I would take the additional time and energy that would be freed up—because it's really hard to make great products—into building a big business."

And my goals heavily involve wanting to have impact.

Don't you think it's possible, though, that there's going to be a Balkanization of operating systems?

The problem, though, is that they own most of the Balkans. (laughs)

I think it's important to understand that Microsoft is very powerful, but they're not omniscient. They make large mistakes and some of those mistakes can be exploited. Competing with Microsoft isn't a Sunday picnic though, and you have to expect that if you try to do this, they will come at you hard, fast, and with a street fighter's sense of fair play.

I think an Achilles heel for Microsoft, in the long run, could be being on the wrong side of the engineering/design dichotomy. On the one hand I spend a reasonable amount of time talking to people at Microsoft and to Bill about design and why they should pay more attention to it, and what they ought to do to do even more to fix Windows, and so on, like make autoexec.bat files and config.sys completely invisible to the user.

Because I'm a realist, and I think the power's going to be in Redmond, and I think they ought to have as good a system as possible.

At the same time I think that ultimately if someone can figure out a way to make products that are better designed for human purposes, that will create some very powerful momentum and be a grounding or an anchor for a company. So the focus on design is actually part of a long-term political agenda.

It does seem that if somebody wanted to set out right now and write an operating system that was both easy to program for and easy to use, for the 486, he would be able to make a great deal of money in a short time.

I think that may be underestimating the inertia factor.

I mean, look at NeXT! They're having a very difficult time. If you can't offer application compatibility, and let's just assume you can't, and your name *isn't* Steve Jobs—I don't know what's going to happen.

The original strategy for ON was essentially this frontal assault on the OS front by doing this object-oriented platform that could sit on top of your basic vanilla operating system that had the multitasking kernel and virtual memory managment and an imaging model. It exists in UNIX, and it exists in OS/2, but we wanted to do something with Apple. But they correctly went with their own strategy of doing something proprietary.

What we were doing was just commercially infeasible. It was the right thing to do, but we just couldn't make the alliances. They weren't going to happen. One could have known that.

What I think *can* happen is that companies can get some stability by doing, let's say, some piece of networking technology like having the standard open relational database server. I don't know if that's going to work for Sybase or not, but plays like that, that sort of don't try to tackle the OS per se but look at some piece of it—or something like Display PostScript, an imaging model... To take components that people are going to want to build on, and sort of drop them into different hardware platforms and establish a constituency that way, strikes me as a reasonably intelligent strategy.

The fact that you've moved to the Macintosh—is that saying anything about your opinion of OS/2-PM?

Yeah. Yeah, it does. (laughter)

So at what point did you become disenchanted with OS/2 and PM?

Well, I was never enchanted with it. Back as long ago as, say, '85, I gave a talk saying that it was going to be probably five years before there were any substantial number of applications that were operating in the paradigm after DOS. This was at a time when Microsoft was saying, like, '87. It was before OS/2 was announced, but they were talking about DOS 5.

I said the 640 K barrier was going to hold up innovation in the PC industry. I felt stupid when I was saying that, because it got no reaction. I was a little ahead of my time saying this in '84 and '85, but it's still the case, and now you've got 10, 20, 30 million DOS machines.

I think Microsoft has done the intelligent and adaptive thing of saying "Okay, we will do Windows 3; we will solve the memory problem, after a fashion; we won't have true preemptive multitasking, but at least we'll have memory protection." It's sort of like Apple's System 6/System 7.

Except for the way it feels.

Right. I mean in terms of its plumbing. This is going to delay OS/2 applications by another couple of years, and it'll probably be the mid '90s before that matures.

I went to an OS/2-PS/2 conference in the city here in May, which was one of the most depressing things I think I've ever been to. Gates was there, and a lot of major people from IBM. They were trying so hard to create an atmosphere of victory. It was just not credible.

It's kind of like Romania, you know? (laughs)

It's business, and I think it's important to realize that most of the people who buy and use personal computers don't really care anyway about the kind of design-oriented issues that we're talking about.

You think that's true?

Well, individual users are very sensitive to this, but I'm talking about the people who actually allocate the budgets to spend the money...

Oh, you mean MIS managers.

And management generally. They're either neutral or on the wrong side, because they just have a different agenda.

Do you think that part of their agenda is maintaining a degree of difficulty and austerity in order to maintain their own power?

Again, intellectual honesty compels me not to try to make the case that they're malicious.

I don't think it's malice, I think it's self-protection.

I look at it this way. This is the way computers have always been. In the corporate world there's always been a

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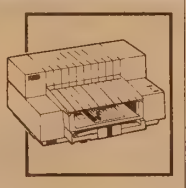

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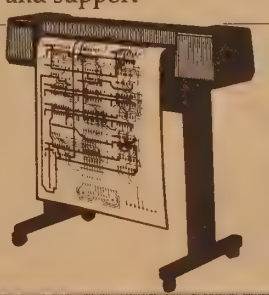

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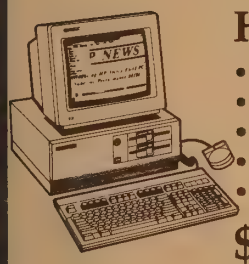

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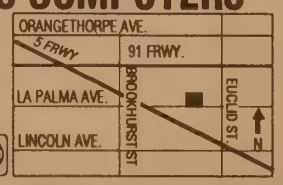

priesthood of intermediaries, and they have no sense of possibility that it should be otherwise. They missed the PC revolution; by the time it got to them it was very cut and dried, and they're interested in performing their function. They're not thinking about a lot of these other things. It doesn't bother them. They don't see anything particularly wrong about the stuff.

I think there's self-interest. And the other fact of the matter, just from the plumbing point of view on the PC side, is that things are still so ridiculously inept when it comes to networking and everything else that the MIS people are *needed*. If they walked away, everything would stop.

It's going to get worse as every machine in the world has to get hooked to every other machine in the world and you've got 150 different protocols for doing it.

My solution to avoiding revolutionary despair is to cultivate a lot of patience and understand that just because you really think you're right as to how things should be doesn't mean that the world even owes you a cup of coffee. And you have to go out and try to make a difference by whatever means you think is appropriate.

Injecting some new ideas into the discourse can help, because I do believe that the typical user's experience of sitting down at WordPerfect, or 1-2-3 for that matter, is still fraught with difficulty. It's frustrating. They feel intimidated. It's generally known that people use a tiny fraction of the features that are in the product. But even more than that, they feel oppressed by the features that they don't use, because they feel like there's something wrong with them.

So my sense is that you help people by saying, "Look, it's not your fault. This stuff is poorly designed by people that are not sensitive to your experience." It's a consciousness-raising activity. We saw what consciouness-raising did in the women's movement, and I think over the long term people will start being less willing to put up with a lot of the stuff and will start saying "Well, why can't things be different?"

Do you think the Mac upped the ante in that regard?

Sure. A lot. And it's also sort of falling victim to the same problems.

I've basically sold a lot of Macintoshes to people because I love them so much myself, and I'm astonished at how difficult people find even the Macintosh.

By the time you get the Chooser and the Control Panel and the Font/DA mover and a lot of things, it's not simple enough. It's funny, because you look at Windows, and they don't even have a Chooser and a Control Panel, though they're starting to get that kind of stuff. They're about four or five years behind.

System 7, I hope, will be an improvement in some regards. At least you could have a little folder and drop your INITs and fonts into it, and you don't have to install stuff.

I think virtual memory is actually going to help if they can really make it work. Because a lot of times things crash—this is something I think that people don't know unless they actually build Macintosh applications. There are almost no facilities anywhere in the toolbox to help you out in low-memory situations. And unless you go through and completely bulletproof your code, if you get into low memory, sooner or later you're going to crash. And that's why the Mac has its well-deserved reputation for not being robust. Boom! When it goes down, it goes down hard.

A while back you said we're still using the Scholl's keyboard, which made me wonder if you didn't think that user interfaces ought to be getting away from that whole alphanumeric jones into something else altogether.

Well, it's kind of a function of what the hardware permits. I think the thing that's going to make the biggest potential difference is being able to create more realistic images on the screen, both photorealistic and moving images, and also things that respond to multiple modalities. The bandwidth from the user to the machine is real low.

A desktop-metaphor graphic user interface is quite a bit better than an **A>** prompt, but it still runs out of juice. One of the big wins to all this virtual reality stuff is to build interfaces that feel more natural.

The problem today with virtual reality is that people let their imagination get ahead of them, and the technology is just not up to it. I like what some of the people on the WELL are saying—that it's sort of like living in Nintendo-land, what you can do today.

But it's so philosophically pregnant.

Yeah. I saw some of the ultimate long-term applications of it, like there's some intriguing questions about personal identity and the mind-body problem. A lot of times when people talk about these scenarios, they'll talk about their puppet in cyberspace. But I realized that if you can have one puppet, you can have five or six puppets. And they're all you—you could be seeing what they're seeing, feeling what they're feeling. It's a question of how much bandwidth you could absorb.

They don't have to be human at all.

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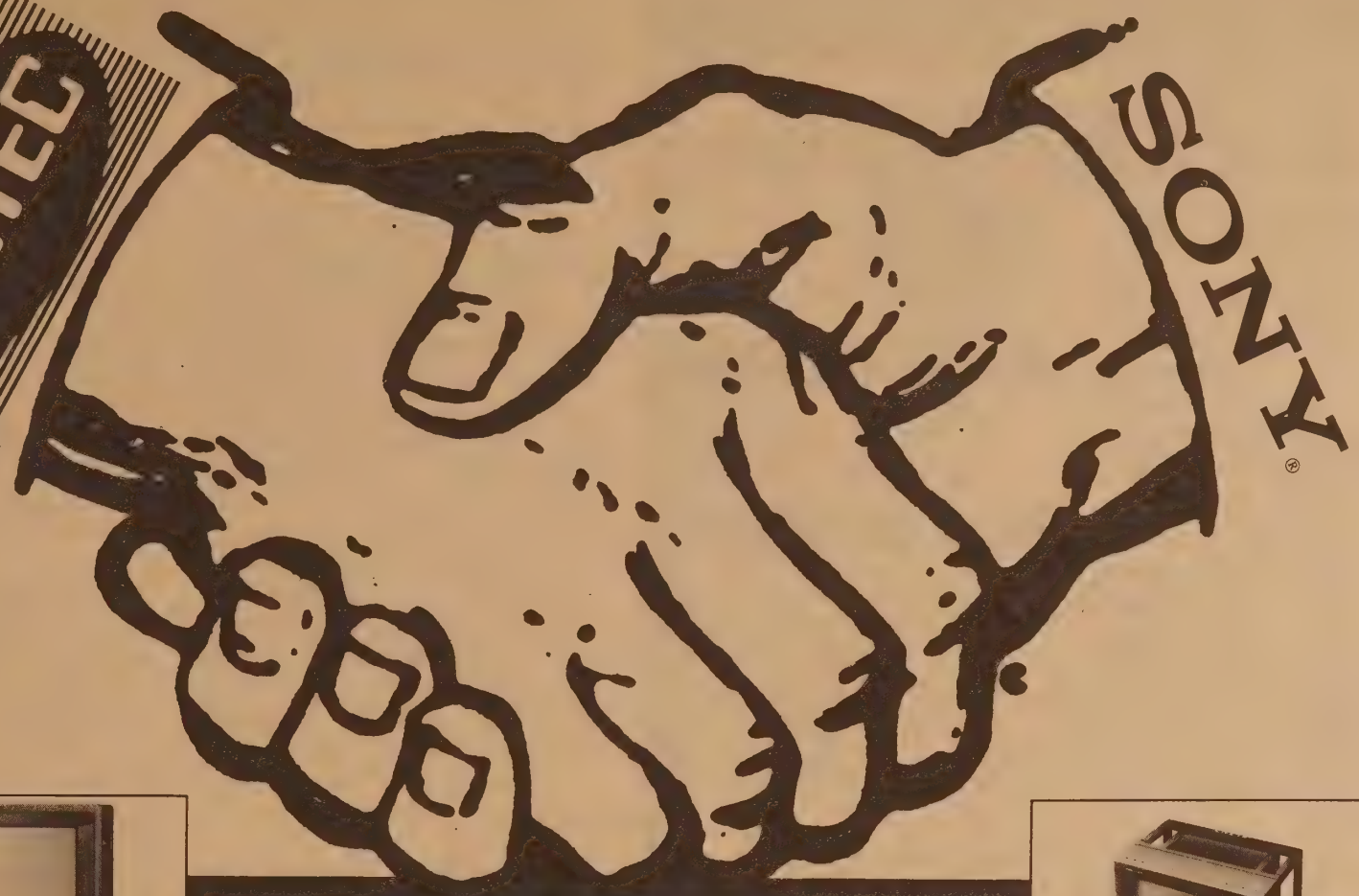

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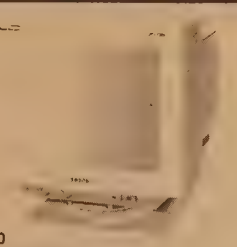

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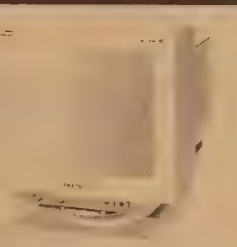

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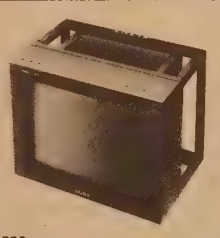

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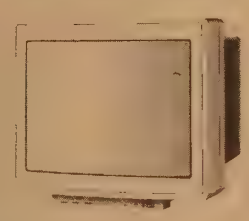

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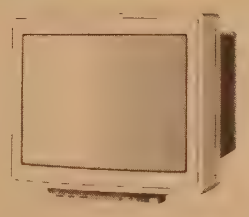

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No. They could be in different geographical locations in cyberspace. Effectively, you could be in multiple places at the same time. There's still one inner train of thought, but you could be seeing and feeling things from several different sources at once.

We've had this strange notion that the mind is local to the body, in fact to the brain. On intellectual grounds, people have argued that that's wrong—Bateson's whole point is that the mind is immanent. Well, VR is going to be the empirical proof that Bateson was right. In the same fashion that AI in some sense is empirical epistemology.

Dan Denner pointed out that the character of philosophy of mind has totally changed in the last decade because of AI. It is no longer regarded as acceptable in the ivory tower—not in the AI community, but in the philosophy department—to do armchair speculation. And VR is going to create this whole new possibility of fieldwork.

It has the same effect of making you suddenly come to terms with the fact that reality is not one of your cut-and-dried matters.

Again from Scientific American: "ON Technology's Kapor faults applications developers for failing to provide a conceptual impetus that would pull capital investment and political consensus towards a more universal service. 'You can't expect Washington to get excited about these things in the abstract,' he says. 'Nobody's thinking about the content side of this.'"

What is the content side of this?

This was in the context of the discussion about ISDN and fiber optic and bandwidth. My observation is that once again the vast majority of the discussion is about plumbing, and I think we ought to be talking about applications. What we're going to do with it, what we're going to push through with it, what the content's going to be, what the tools are going to be for the content. There's no Xerox PARC of this stuff.

Bellcore aspires to be.

But I think research in this area lacks real vision, is generally underfunded and isn't well enough connected to the commercial world.

Within the computer research community, appreciation of the computer as an information and communication medium is still fairly incoherent and isolated as a view.

I think the key is to make people understand that just like print is a medium, and broadcast television is a sick medium (laughs), whole bunches of computers networked together in various ways represent a medium of information communication that is as important and as revolutionary as the printing press.

Once you start thinking about that, it raises a whole set of questions.

Well, what kind of medium is this? How is it different, how is it better than other things, how is it worse, what can it be used for that's different from what we do now? But the fundamental questions aren't being asked, because people do not have that framework of computers as media. I think that's terrible.

But do you think that people even understand what information is?

No. I'm not sure *I* understand what information is.

What do *you* think information is?

Well...information is sort of semi-crystallized mind stuff. (laughs) It's intangible. It's not bits, it's what the bits embody. The problem is that we don't have good ways of talking about these sort of intangible immaterial things. It's why computer software can't be designed well.

When you build a bridge, you're building this artifact, and it's made up of beams and girders and steel.

You know what it's supposed to do.

And when you build a piece of software, you've got these artifacts of objects that make it up, but none of them have any physical embodiment. You've got a menu here and a table there. But they have properties, the things that make up the programs, they have behaviors, they have potential appearances, but we have a totally impoverished vocabulary and conceptual framework. We don't know how to talk about the stuff.

There are a lot of parallels if you go back to Gutenberg. The first books were just like manuscripts—same size, he tried to make them look identical. Big heavy things chained to library tables, incredibly beautiful works of art. It was only over the next half century that people actually invented things like page numbering. And somebody figured, "We'll build an index!"

Well, these are sort of inventions of mind stuff, of intellectual property, that turned out to make all the difference in making the book something that had a high impact on society. They made them small, they made them legible, they put page numbers on them, and pretty soon everybody started reading.

I guess the point is that the kind of thing that information is, and the tools that we want to use to manipulate information, are in this realm of digital media, the same sorts of things as the idea of page numbering, only we haven't invented them yet and we can't really talk about them. So we're

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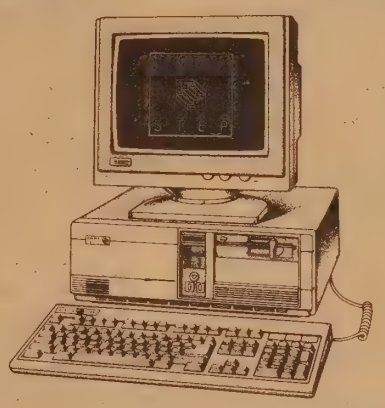

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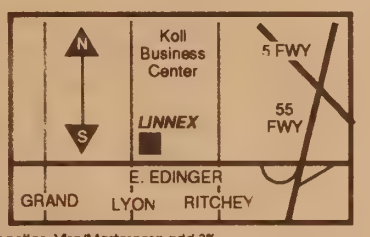

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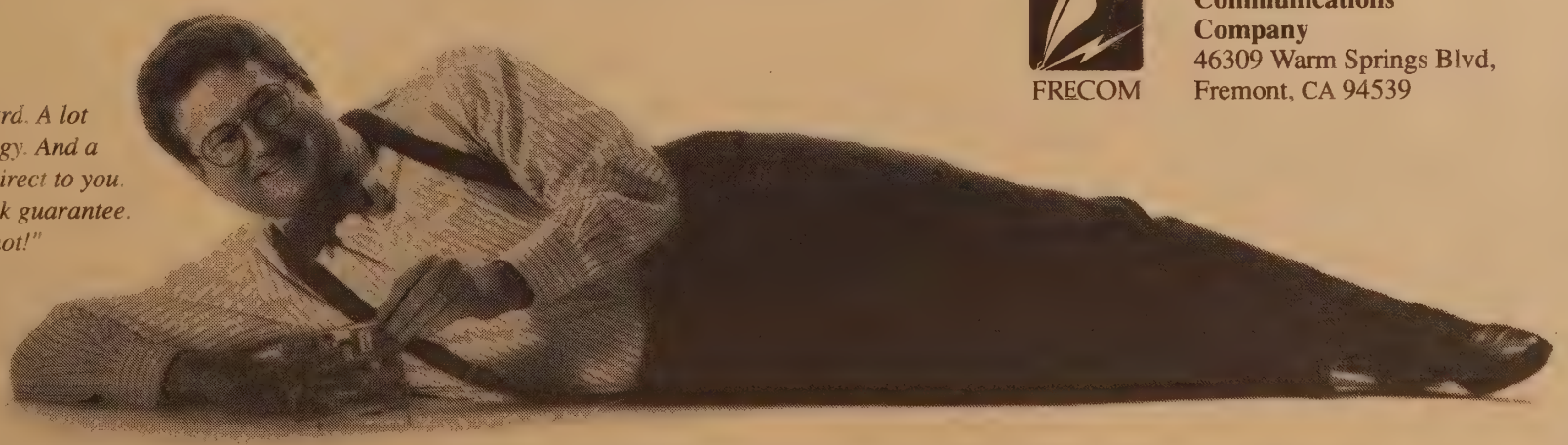

Paul Masters, UC Berkeley MBA and Northern Telcom alum, is President of Fremont Communications

"I'd say programs that are not only functional but also are pleasant to use actually help you get your work done a lot better than something you feel that you're struggling with."

sort of fumbling around and we wind up spending all our time fantasizing about video dialtone. That's the latest buzzword that I've heard. When you have fiber optic connections from the phone company, the phone company says "We'll give you video dialtone!" Great buzzword, but...

Because otherwise people are just going to be ordering up *Debbie Does Dallas*, and they won't even have to go out to the video rental store.

Doesn't it seem to you that there's an enormous amount of energy and resources going into endeavors that don't really advance the cause much?

Just like reality! (laughs) Yes, I do.

This is certainly not an era of great visible progress. But didn't Mao go off on this long march, they marched like ten thousand miles and went off and lived in the caves for a while?

Are there any software products on the market right now that strike you as being particularly well-designed?

I kind of like After Dark, the little screen saver that you can drop different things into. It's very amusing. (laughs) It's very simple. It's open—you can write these new things to drop in, and it lightens up your life a little.

This actually ties in with something I wanted to ask you about, the importance of humor and playfulness in creation technologically.

Yeah, I think it's very important. There are a lot of different ways of keeping a light touch—sometimes you do it explicitly, sometimes you do it very, very subtly, but things that take themselves too seriously are not life-supporting.

What about people like the basic Lotus power-user? They just want the tool, and they want it to work, and don't bug them with all these side issues. Every time you say, "Well, this is kinda neat," they say, "Yeah, but what's it good for?"

Well, I think they have a point. They're coming to try to get something to help them get their work done, but the question is what sorts of things help them get their work done?

I'd say programs that are not only functional but also are pleasant to use actually help you get your work done a lot better than something you feel that you're struggling with. So I'd say that even to the most hardheaded user, the case for good user-centered design of the products and making the programs be appropriate to the tasks they're trying to perform is completely legitimate.

One could also make a pretty good case that casting all those completely unverifiable projections into the financial future is not necessarily a helpful thing to be doing.

Spreadsheet abuse!

There's an awful lot of hypnotic spreadsheet abuse, exactly.

Well, it's like almost any sort of artifact that has value. It can be abused and is.

The whole idea that people spend extraordinary amounts of time number-crunching—that ties in with the unfortunate trend in society that people have been trying to make money by doing financial manipulations rather than adding genuine economic value. I suppose the spreadsheet has helped that. In that context, we live in a society that does a great many things that are not admirable.

Well, doesn't it seem like we're in a virtual world already?

A virtual world?

Yeah, in the sense of living in these financial realities that are defined by numbers in a spreadsheet.

Well, it's a self-created sort of world. It's hard for me to take a position that some realities are more real than others. It's tempting to say that this world of numbers is virtual but the world of trees and rocks and flowers is the real reality. I'm not prepared to defend that viewpoint.

Thank you. I needed that.

In terms of things that are well-designed, this thing (the Compaq LTE 286) has a lot of problems, but this form factor is just terrific. I can actually carry it around. I run Lotus Agenda on it. It's too big, but it's the best that's available.

This is well-designed. They've managed to get all this stuff into this little box, and the screen is readable. The screen's nice, within its paradigm, and it's light.

I've been thinking about buying one of these, ever since the Mac portable fiasco.

I'd wait. I think the next edition of this is going to have a 386SX, which you want to have. Hopefully they'll put in VGA screens—this is a CGA, so you can't run Windows on it and stuff like that, and they'll put in static memory. The Toshiba 1600, which is a bit bigger, has this great thing where you just pop the button and you're right back where you were. But this is pretty reasonable. You can do real work on one. It's the right size.

What happens when companies quit being able to create, and why is Compaq able to make that, and Apple isn't?

Well, in other parts of their respective product lines, you'd probably rather have a Mac IIci than a Compaq 386/33.

There are a couple of things to be said in Apple's defense on this issue. The first portable that Compaq made, which no one remembers, was this 29-pound thing. And it was fantastic, because until then you couldn't move the thing around with you. So good is relative.

Compaq has been building smaller machines for quite a while. Apple is just earlier on the learning curve. They did one good thing on the portable, which is that they did not compromise quality. It's a real Mac, and feels comfortable to use, and I have one and I use it. I think they could have done an 11- or 12-pound one the first time out.

Or one that wouldn't fall off your knees...

There's a bit more stuff to worry about in the Mac Portable than in one of these. But they better fix it.

I don't want to focus too much on Apple, but there is the question of what happens with technological creation in institution. Closer to home, I watch Lotus struggling with it.

I don't think anybody has solved successfully the problem of how you innovate in a large corporation. It's harder to innovate in a big company than in a small company. The big company has customers who exert a major backwards drag.

Look at IBM.

Yeah, they're a terrific example. Large companies also have multiple constituencies vying for attention internally in terms of what they should do, and organizationally people don't know how to run big companies in a way that preserves people's humanity. I don't know of any.

"The whole idea that people spend extraordinary amounts of time number-crunching ties in with the unfortunate trend in society that people have been trying to make money by doing financial manipulations rather than adding genuine economic value. I suppose the spreadsheet has helped that."

And on the other hand, nobody has figured out how to run an economy with the standard of living that we've got built entirely out of little companies. So we've got a real problem here (laughs).

But don't you think there's a trend there? Don't you see a lot more little companies?

A trendlet, yes. Because now there are better tools available. There are many things that used to require a large company that can now be done in a small company. On the other hand, certain things like building operating systems and big applications require, if you're really going to maintain that, building something of a fair size. There are some unsolved design and unsolved social engineering problems in which there are no really first-rate alternatives. Every alternative seems to have some drawbacks.

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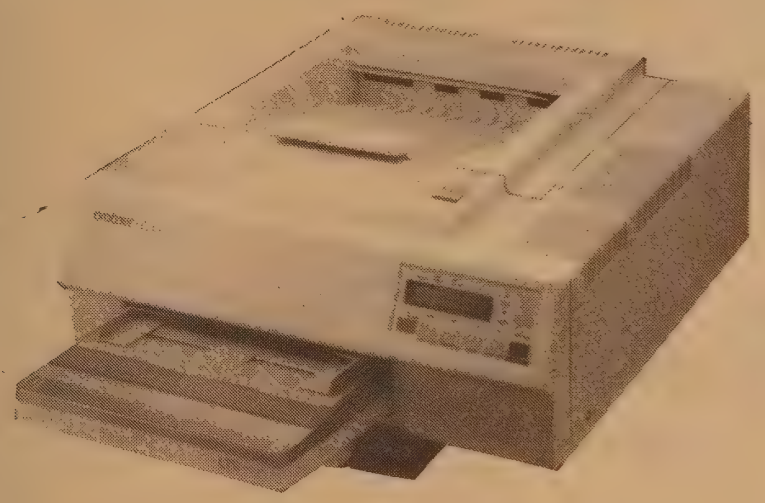

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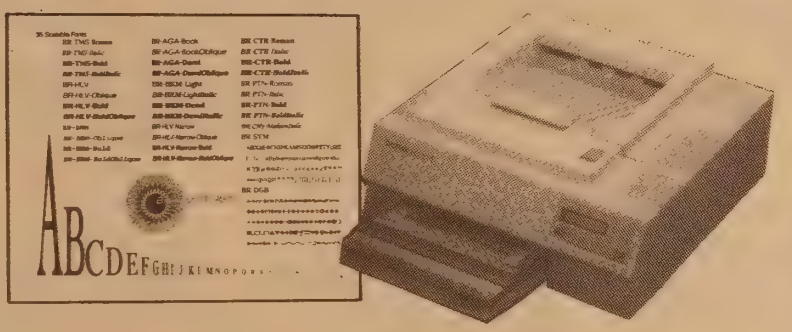

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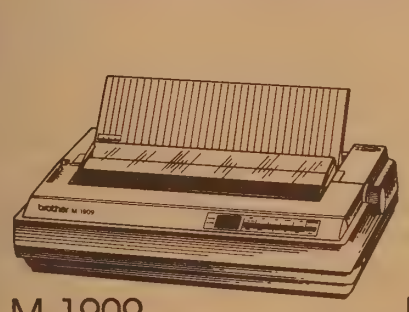

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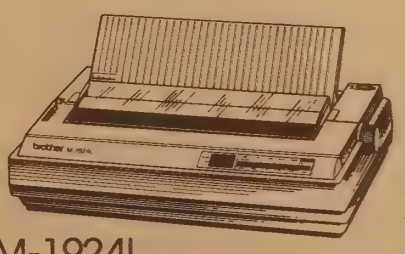

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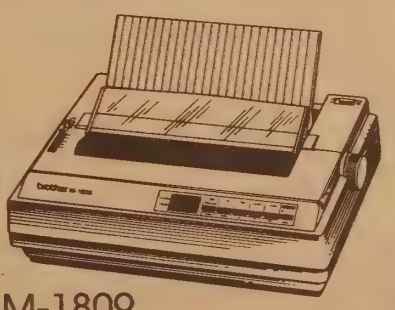

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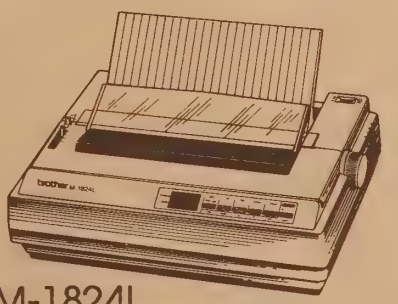

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Networking The Mac Office

The First Step: Sharing A Printer

From A Recent WELL Posting:

We have four Macs (two SE's and one IIcx) in four rooms, and one LaserWriter II in a room with the IIcx. We need to run cables through the walls. No one was able to recommend a reliable cabling place, so I pulled four names out of the Yellow Pages.

It was fun getting these quotes, because each company that came out gave me a different line about what needed to be done. Out of four places, one gave me the $650 quote and seemed really with it—they're going to use our telephone system and some additional cabling to do the hook-up. One place told me that what I wanted couldn't be done and that I'd need to have someplace else design a system that would work. Another guy said that he'd charge $600, but then we'd need to buy the TOPS program to make it work, and that would cost $110/copy, and of course we'd need four copies.

I'm waiting for one more quote to come back, and I'm curious to see what story these people are going to give me. I feel like calling the guy back who told me what I wanted couldn't be done (he didn't even know how to turn on a Macintosh; I don't know why they sent him) and saying "nyah nyah nyah."

BY MARY EISENHART

Your office has reached the stage where you're starting to look at networking your Macs. If you're like most users, you'll probably want to start by sharing some expensive resource, like a laser printer, among several computers.

Like the author of the WELL posting, you may be about to enter the Twilight Zone—conflicting information, wildly opposed advice, and much confusion. This series will address some issues and products to consider in setting up your Macintosh network, starting with simple matters like peripheral and file sharing and moving to more sophisticated considerations like mulitvendor networks and the like.

THE GOOD NEWS

Much emotion has been generated over the high price tag of the Macintosh. However, when you're about to network a few machines, you encounter one of the Mac's main value-added properties: a whole lot of what you need is part of every Mac package, hardware and system software. And a lot of what you do have to buy is as close to plug-and-play as current networking technology gets.

For something as simple as sharing a printer, you don't need to buy any additional software at all. It's all in the System software. And to connect the machines, you can either use Apple's own AppleTalk connectors or follow the majority of Mac networkers and go for the low-cost PhoneNet option from Farallon.

To hook up three Macs to a Fujitsu laser printer (see sidebar), we spent about $200—for four PhoneNet connectors and a goodly amount of modular phone parts at Radio Shack. And, except for some mishaps where a staple went through the phone cord, resulting in some fried parts, the network's been working fine since the middle of last year.

SETTING UP A SIMPLE NETWORK

First of all, make sure all the Macs you want to connect have all the AppleTalk software (which is included with the System software) in the System folder. You'll need it later.

We acquired four PhoneNet connectors; the type you'll need depends on what types of Macs and peripherals you're using. Each connector comes with six feet of phone wire, and attaches to either the printer or modem port of your Mac and the serial port of the printer.

Depending on various factors, including foot traffic levels and the distance between Macs, you may want to bring a professional into the process. We took the guerrilla do-it-yourself approach (take the stapled wire as a cautionary tale)—when we discovered that we needed a lot more than six feet of phone wire, we went to the local

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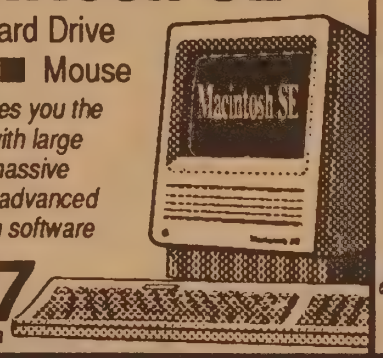

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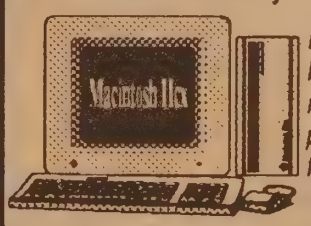

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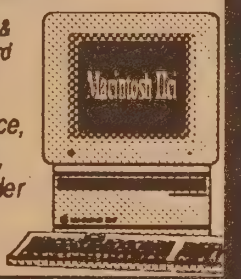

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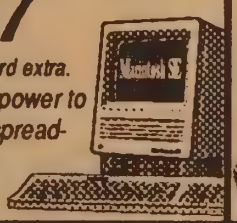

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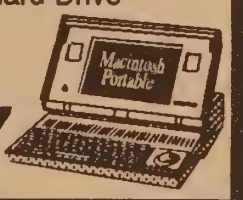

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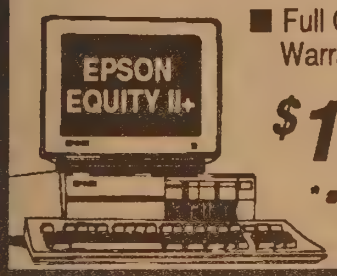

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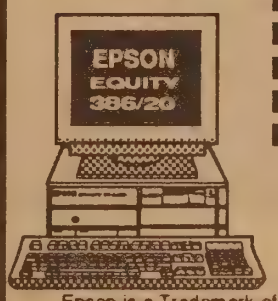

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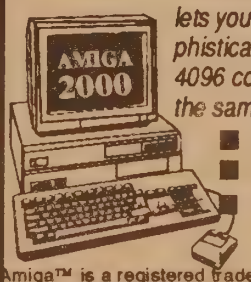

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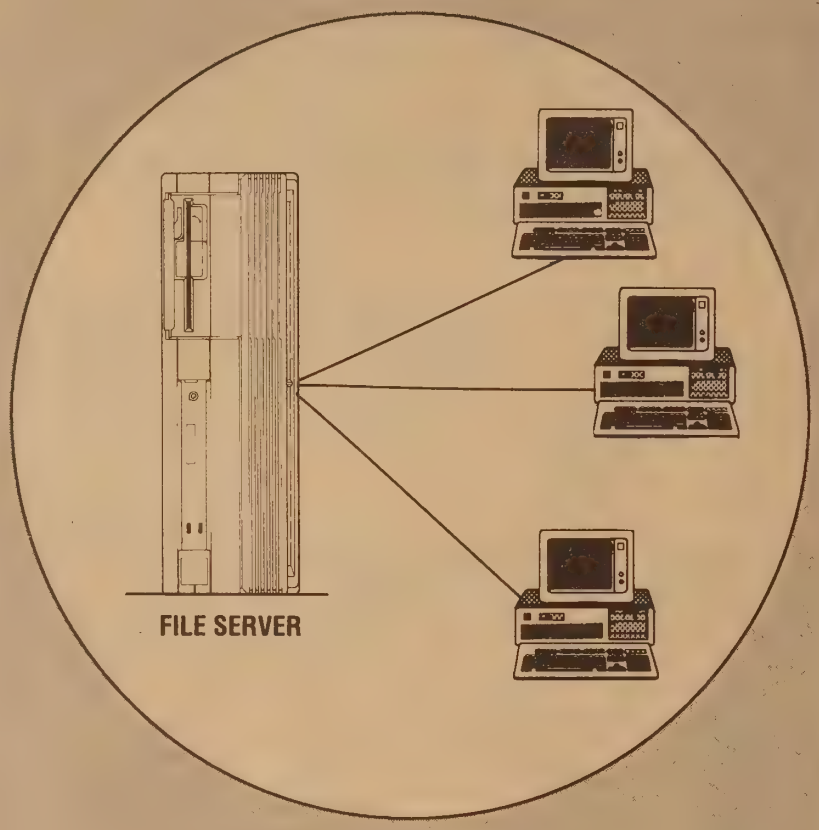

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NEXT MONTH

Once you've sent a few documents to the printer, it occurs to you that it would be very convenient to send files and messages to other users. We'll talk about QuickMail, a product that lets you do this, next month.

Radio Shack and picked up a few 20-foot cords and modular connectors. My SE/30 is connected to the Fujitsu by an inelegant kludge of one seven-foot cord and one 20-foot cord, which I run over with my chair quite frequently. You might well want something more solid, but this works just fine.

Farallon's instructions are clear and simple; once the elaborate festoons of phone wire had been stapled to the walls, it took considerably less than an hour to get everything connected to everything else.

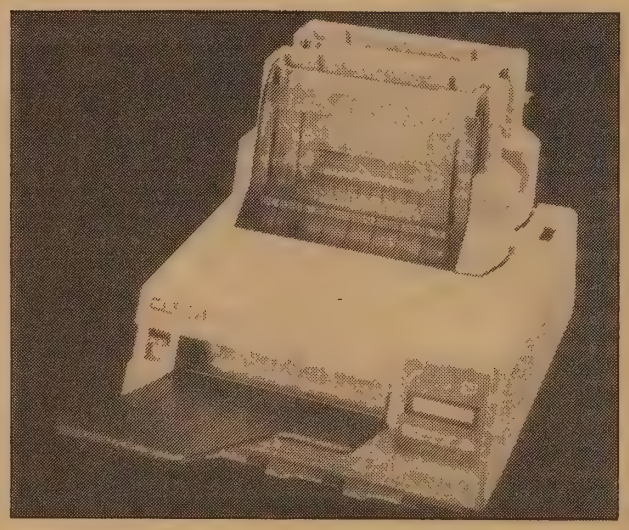
Once that's done, each Mac user on the net should make sure the proper printer drivers (e.g., AppleTalk LaserWriter, or the driver that comes with a non-Apple printer) are in each Mac's system folder. Each user should pull down the Apple menu and select the Chooser. The Chooser will ask to have a printer selected; select the appropriate one. Be sure AppleTalk is Active in the Chooser, and type in a name for your Mac in the dialog box.

Then start sending documents to the printer. (Farallon, 415/596-9100.) ■

THE FUJITSU RX7100PS PRINTER

Long a mainstay of the DOS printer world, Fujitsu introduced this PostScript-based model as its first Mac-compatible unit. In terms of speed and functionality, it's roughly comparable to a LaserWriter NT, though there are differences that may be significant in some situations.

In several months of hard use, the printer has been very reliable and apparently completely software-compatible with LaserWriters—it's printed everything we've thrown at it, PostScript or otherwise.



Unlike LaserWriters, this machine has its paper feed mechanism on top; it takes up less horizontal space but more vertical space than its Apple counterpart. One very handy design feature is the Fujitsu's standard two-paper-bin configuration, so you don't have to change paper every time you need letterhead. (The downside is that Macintosh printer drivers don't recognize the existence of two paper bins, so you have to select the bin manually from a panel on the printer.)

In our experience the vertical paper-feed mechanism was somewhat more prone to paper jams than the horizontal equivalent on LaserWriters. Also, while the LaserWriter's handling of envelopes is less than wonderful, it does print envelopes. The Fujitsu's manual cautions you against trying. We tried. It was right.

In addition to LaserWriter emulation, this printer will also emulate an HP LaserJet. It should be particularly attractive in multivendor networks, since it has both a serial and a parallel port. We'll be addressing the DOS/Mac issues in a future article. (Fujitsu America, 408/423-1300.)

—Mary Eisenhart

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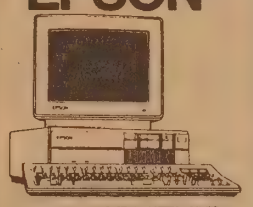

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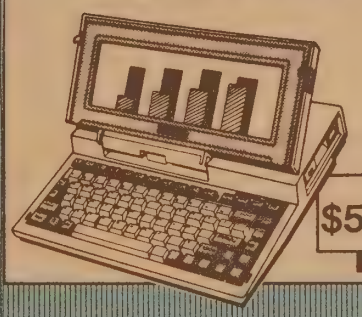

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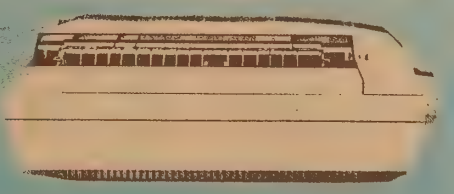

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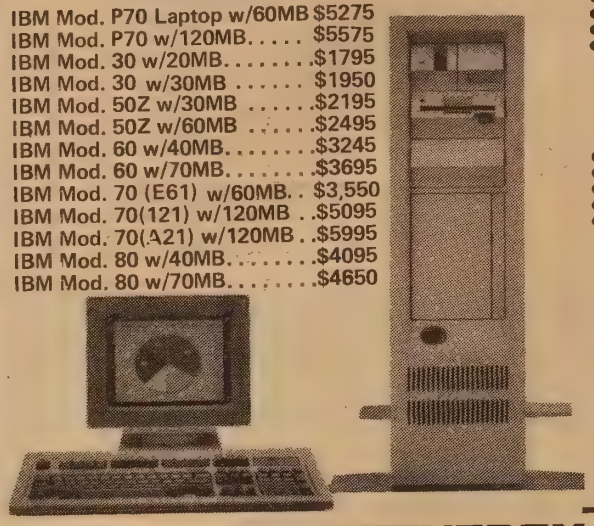

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20MHz 386, 1MB $1,595
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386's also available

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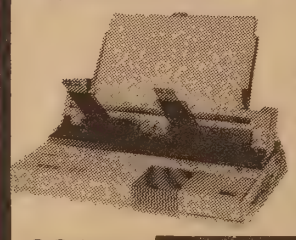

brother

M1809, 360/50cps, 80 col . . .$379
M1909, 360/50cps, 132 col . . .$525
M1824L, 24-pin, 270/90cps, 80 col. $499
M1924L, 270/90cps, 132 col . .$659
M4018, 480cps, 132 col.. . . $1,295
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LQ-1050 – 24-pin, 132 col . . $769

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Fujitsu 3400, 24-pin 132 column, 288/72cps, color optional. . . $499

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2200 –, 24-pin, 180cps, 80 col .$355
5200 – 24-pin, 265cps, 80 col .$565
5300 – 24-pin, 265cps, 132 col .$765

OKIDATA

320 – 300/100cps 80 col . . . $365
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390 – 270/90cps, 80 col. $479
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393 – 450/120cps, 132 col . . .$985
393C– above w/color $1075

PANASONIC

KX-P1180, 80 col. 192cps. $189
KX-P1191, 80 col, 240cps. . . . $249
KX-P3151, daisywheel, 22cps. . $349
KX-P1124, 24-pin, 192cps. $289
KX-P1624, 24-pin,192cps $435

TOSHIBA

P311 ExpressWriter, 180. . . . .$379
Toshiba P321-SL– 24-pin $445
Toshiba P341-SL – 24-pin. . . .$585
Toshiba P351SX – 360cps. . . .$965

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5.25" DRIVES

Teac, Fujitsu, Toshiba

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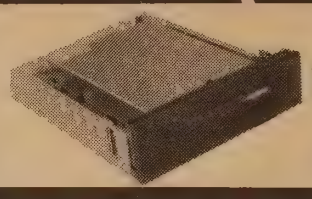

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Teac, Sony, Fujitsu, Toshiba

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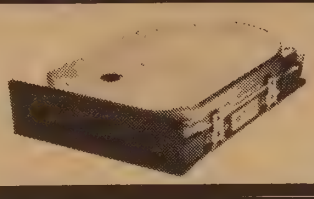

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JET 2400 internal modem w/MNP error correction $95
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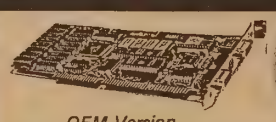

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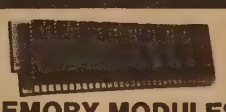

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1MB for AST 386-33. . . . . $199
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2MB for Compaq 386-33. . $475
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2MB – Equal. IBM 30F5360 $250

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2MB for H-P IIP. $385
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VGA Combo . 640x480 .$475
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Amazing 8484 1024x768 VGA .$425
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Estibid	B004A, B,C,D,E	Major estimating program for manufacturers & contractors.

DESKTOP AND PLANNERS

Mylog	B010	This program has a time in & out track system for billing purposes.
Today	B011	Keep track of what you did today and find out what celebrities did on this day in the past.
ACS Incontrol	B012	Monthly appointment calendar.
Ticklex	B013	Business professional's calendar, Tickler.
MOE	B022	Mini database with "Pop-up" features.

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Purchase Order System	B032	Menu driven to easily create, edit, & print all of your orders.
Invoice Writer	B033	For writing invoices, fast & easy, menu driven

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Inventory Master	B055	Inventory order report, calculate how, when &where to buy.
DTS Inventory	B056	Tracks stock items across as many as 15 stores (30 available).
CS INV	BO57	Inventory program that adds, updates inventories with each transaction.
Point of sale INV	B058	Complete inventory program uses basic to update, list your stock items.
Parts INV Con	B059	Complete inventory program.
Parts INV HD	B060	Same as above but for hard disk.

REAL ESTATE

Landlord	B070	Complete rental management system, maintains complete financial records.
Priceton Real Quick	B071	Real estate management package, perform market & agent sale, Analysis buyer qualification.
Easy project	B072	Efficient easy to use inexpensive project management & tracking system.

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Kermit	C001	Great communication & File transfer system for any mainframe.
PC-TV	C002	Helps you change to the newest version of Kermit & keeps it external to the main program.

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File Express	DB001 A,B	Easy to use, menu driven complete data base system with documentation on disk.
Filemaster	DB02	Programs help you manage your paper files and organizes information.
Nimble File	DB03	User friendly, menu driven with mailing lists, names, address reports.
PC-File DB	DB04 A,B,C	Newest version of PC file from Jim Buttons compatible to Dbase III.
Cardex	DB05	Creates a rotary index file.

EDUCATION

COMPUTER KNOW HOW

Computer Tutor	E001	Learn the IBM PC & keyboard easily.
Public Domain Tutorial	E002	Learn to run public domain software quickly.
PC-Fastype	E003	Learn to type & use the IBM keyboard, upgraded to color.
PC-Touch & Letterfall	E004	Touch typing and typing tutor that works on Mono.
Beg. Lotus 1-2-3	E005	Beginning tutor for Lotus.
Adv. Lotus 1-2-3	E005	Advanced tutor for lotus.

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Amy's primer	E015	Teaches 2-6 year olds the Alphabet and number using animals.
Play and Learn	E016	Young ones (18 months to 4 years) will keep busy for hours with colors and the alphabet version.
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Kid stuff	E019	Program for pre-school children (2-5) matches the pictures using the keyboard.
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Equator	E050	Formulas in science, math and finance easy to operate format equation.
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GAMES

ARCADE GAMES

Arcade #1	G001	8 Great games: Mariob, didug, hopper, centipede, dragon...
Arcade #2	G002	Tank, 3-demon, pango, kong & others.
Arcade #3	G003	Mario, Pacman, pac-gal...
Fly/Drive #1	G007	Cars, planes, racecar, all great....
Fly/Drive #2	G008	More cars, trucks, planes, and others...
Space wars	G012	Space war, batalia, space invader....
Pinball Machine	G014	6 great pinball machines. The flippers will amaze you.

BASIC GAMES

Basic Bonanza #1	G015	Too many games to list. 40 diff. files.
Basic Bonanza #2	G016	55 different files.
Basic Space Wars	G019	Shoot-em ups in space.
Basic Fly/Drive	G021	Trucks, planes, submarine...

CARD GAMES

Favorite Card	G035	Hearts, canasta and children's favorites
Basic Card	G036	Euchre, Cribbage, Solitaire...
Solitaire	G037	Several types of solitaire.
Gin	G038	Good gin rummy game.

GAMBLING & LOTTO

KPS Lotto	G085	Lotto tracking program offers a very good wheeling system.
Lotto-Master Professional	G086	Tracks, bets, checks bets against lotto drawings.
Dominos	G121	Dominos, backgammon, checker...
Tommy's wheel	G122	Wheel of misfortune, easy to use.
Block games	G123	3 games using blocks.
Tommy's 21	G124	More games from Tommy's toys.
Tommy's saucer	G125	Drive a flying saucer if you can figure out the aliens controls.
Tommy's Trek	G126	The familiar trek game is well done.

COLOR GRAPHIC GAMES

Cave Quest	G042	Diff. from many other fantasy role playing computer games (in graphic)
Castle Adventures	G043 G044	Castle and 3 other good games (Fun) Labyrinth, excellent maze game.

MISCELLANEOUS GAMES

Trivia	G110A,B	Great trivia game rivals the board game.
Tommy's trivia	G111	Questions prepared by aliens from beyond to stump earth kids.
Trivia	G112	TV shows, science, grab bag, star war.

LABELS & MAILING LIST

Stikme 1.0	U130	Excellent label printing program for 3 1/2 by 15/16 inch labels.
Label maker	U131	Makes labels for 5 1/4 & 3 1/2" disks.
Diskover & Label Maker	U132	Prints your directory listing on label or on disk covers.
Label Master	U133	Makes lists of labels.

PRINTER & BANNER UTILITIES

Bannerific	U150	Produces large banners.
Banner maker	U151	Lets you use diff. fonts.
Fontastic	U155A,B	Edit and generate fonts.

GRAPHICS

FORMS & LETTERS

EZ-Form	FL01	Form generator w/many forms on disk & good documentation.
Formgen	Fl02	Easy to use, menu driven, online help
Legal forms	FL03	Over 100 legal forms to be used.

ART & PAINT

PC-ART	GR15	Easy to use graphics drawing program
Finger paint	GR16	Read documentation to run, also has a demo on the disk.
Macpaint	GR17	Presentation graphic screen system.

FONT GENERATORS

Newfonts	GR22	Turbo pascal graphic font designer.
EGA Font ED	GR23	Unusual to find one for the EGA.

PRINTING, GRAPHICS & CLIP ART

PMmain	GR25	Great clone of the print master prog.
Artcom	GR26	Get more use out of your graphics.
Printmaster	GR27	Assorted graphics to use with your favorite page layout program

PRESENTATION GRAPHICS

Easy presentation Graphics	GR45 A,B,C	Transform numerical spreadsheet sheet data into clear charts and graphs.
PC-Graph	GR46	Menu driven, plot Dbase and report files created by PC file.

UTILITIES

EGA & VGA DEMO DISKS

Egademo #1	Boxes and balls in different shapes and sizes flying perfect formation.
Egademo #2	This one has a Rolex clock on it, roses, and Mona Lisa with her famous smile.
Egademo #3	EGA paint 2005 demonstrates Alaska and Arkansas in living color.
VGA Demo #1	It has a waterfall that is truly beautiful, fireworks, plus much more.

WORD PROCESSING

PC Write	WP01 A,B,C	Excellent documentation and over 500 features (best on the market).
Galaxy	WP02	Easy to use., menu driven.

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The Pick Of The Notebook-Sized Portables

BY ED KAHN

Years ago, I looked into a crystal ball and saw a six-pound notebook-size computer with a decent screen, large hard disk, floppy drive, and room for all of the accessories I would want. I could see the machine clearly, but could not make out the manufacturer's name.

Now I know that the name on the machine was Compaq. Indeed, this is the machine I have been waiting for. When it comes time to return it, they may have to fight me for it. This machine offers much the same performance as the 15-pound Compaq 286 I praised last year, only in a smaller package. It is powered by an 80C286 processor running at 12 MHz.

At less than two inches thick and a paper-perfect 8 1/2" x 11," this is as small as I think a computer should get. It can get lighter, but not smaller, because this is the smallest size that will allow a decent keyboard and display screen. Smaller units, which are getting a lot of attention these days, really do not work for me as full function computers, no matter how much power they pack.

NOT A DESKTOP

This unit is not simply a smaller version of the portable 286. It would be possible to use the larger machine as a one-and-only computer by connecting to a VGA display and the expansion chassis which Compaq offers. This machine, however, is clearly a machine to use on the go. It has a smaller display, measuring about 8 1/2" diagonally. But more importantly, it does not offer VGA compatibility. The CGA display works just fine on the portable, but makes working with text on an external monitor less than ideal.

Aside from this, the functional differences between this lightweight unit and the 15-pound big brother are minimal. The keyboard on the LTE is pretty standard, but unfortunately it uses the Fn key to call up some of the functions that one uses regularly when working with words. The addition of a numeric keypad ($119) makes writing on this computer a good deal more to my liking. Although the keyboard lacks the full stroke of a conventional keyboard, it is large enough for me to type well. It has a good feel and layout.

Although the market is now being flooded with super-light portables, this is the first one I have worked with that really gets the job done without forcing me to make tough choices. I have never been happy with lightweight computers that offer alternatives to hard disks.

OPTIONS

Compaq makes this computer in three configurations. The top of the line model ($4,999) has a 40 Mb hard disk as well as a double density 3 1/2" drive. The model 20 ($4,499) comes with a 20 Mb hard drive. An entry level model ($3,899) comes with only a 3 1/2" floppy. Although Compaq machines are not inexpensive, they do offer all the options, and everything always works perfectly.

This machine comes with 640 K memory standard, but it is expandable to 2.6 Mb with the addition of a memory upgrade kit ($1,299). This memory is configurable as LIM 4.0 to accommodate software that requires expanded memory.

The basic computer does not come with an operating system, but they give you a choice of DOS 3.31 ($120) or DOS 4.01 ($150). Compaq, like most computer manufacturers, has Microsoft customize their versions of the operating system. In the release tailor-made for this computer, DOS 3.3 offers the ability to run partitions larger than the standard 32 Mb. This allows you to run the entire 40 Mb hard disk as a single partition. In many ways, although I like certain features about DOS 4.01, this works out to be a better arrangement because it avoids both the additional size and some of the software incompatibilities of DOS 4.01.

Although the market is now being flooded with super-light portables, this is the first one I have worked with that really gets the job done without forcing me to make tough choices.

In addition to the built-in floppy drive, it is also possible to attach an external floppy or tape backup. Either a 360 K or 1.2 Mb drive costs $275. Both, however, must be used with an External Storage Module ($349). A 40 Mb tape drive ($799) requires the same storage module. A final option is a second 3 1/2" 1.44 Mb floppy drive ($275), which is a self-contained unit drawing its power from the computer itself. The external storage module has its own power supply.

A built-in 2400 baud Hayes compatible modem ($449) fits neatly into the basic computer. No communications program is included with the unit. This is a no-frills modem that does everything it is supposed to do.

Communications software that can get you started is also included.

The Compaq LTE/286 is not only small; it is efficient. The whole system is designed to conserve power. From the backlit screen to the hard drive, ports, and modem, the setup program allows you to configure things to shut down during periods of non-use. The components spring back to life with the touch of a key.

The computer is powered either by the internal nickel-cadmium battery pack or by the AC adapter, which also charges the battery pack. The batteries will keep things going for about three-and-a-half hours. If you purchase an extra battery pack ($129), you can easily exchange batteries when the first one runs down. The pack weighs about a pound and a half, and is about the size of a couple of packs of playing cards. An external fast

RESOURCES:

The Compaq LTE/286 $4,999
Compaq Computer Corp.
20555 FM 149
Houston, TX 77070
(713)370-0670

Worldport 2400/MNP Modem $495
Touchbase Systems, Inc.
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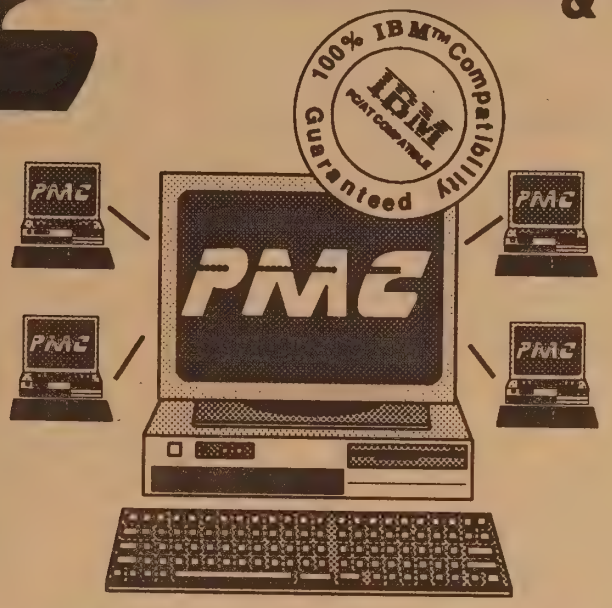

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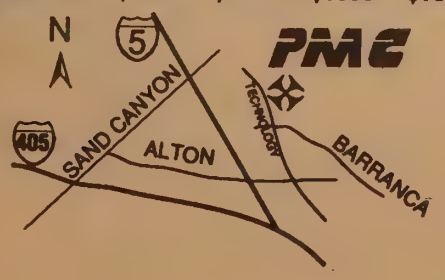

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charger ($199) will let you charge an external battery as well as the one in the computer in an hour and a half, whether you use the computer or not. The included power supply takes between eight and ten hours to recharge a battery.

For people who are in their car a lot, an automobile adapter ($129) is available. Although I never use a computer in the car, I like these units because you can easily recharge while driving—often easier than connecting to a conventional power supply. This is especially handy in foreign countries, although all of the Compaq equipment is set up to automatically adjust to different power systems found throughout the world. You nevertheless will need special Compaq power cords designed to fit the receptacles in different countries. Compaq asks you not to use the standard appliance converter kits.

Unlike other small modems that I have seen, [the WorldPort 2400/MNP modem] includes a speaker, which I consider essential for a modem. I could use this gem every day without compromise.

Compaq documentation is always a pleasure. Nobody does a better job of presenting instructions for getting started and keeping things going than these folks. Information is well-organized so you can find what you want without going crazy, yet there is enough detail so you will not feel stranded if you need to know something. Separate documentation is available for each of the peripherals and the operating system you choose.

The package can be rounded out with a carrying case. Included is a slip case that holds just the computer. For many outings, this is really all you will need if you start with a fully charged battery.

For an extra $89, you can buy their optional carrying case. This is really worth it. It has two large compartments—one on either side—that are each closed by a zipper arrangement that lets the sides hinge all the way open. The one large compartment is custom fit for the computer itself and nothing else. The other side has a compartment with movable dividers held in place by Velcro that can be set up for the accessories you want to take along. There is enough room to hold power cords, AC adapter, telephone connection wire for the modem, and disks and still have room to spare. The case has a shoulder strap as well as a handle.

ANOTHER OPTION

I have talked about the 80286 version of this computer. I should, however, point out that Compaq makes an 80C86-based model that has the same size and takes most of the same accessories for a lot less money. The model with a 20 Mb fixed disk lists for $2,999. If you don't need the speed or as much memory—it can expand only to 1 Mb—this may be the way to go. Any Compaq is a pleasure to use. Each of these models carries a one-year limited warranty.

ASIDE—THE WORLDPORT MODEM

I have recently seen a standalone portable modem that runs circles around anything else I have found. The WorldPort 2400/MNP modem ($495) is the Mercedes of modems. It has every feature you could want in a package a little larger and much better for you than a pack of cigarettes. The documentation is thorough and readable—as much as modem documentation can be. Unlike other small modems that I have seen, this one includes a speaker, which I consider essential for a modem. I could use this gem every day without compromise. You are paying for the size, but not compromising on quality or features. Take a look if you are in the market for a modem. ■

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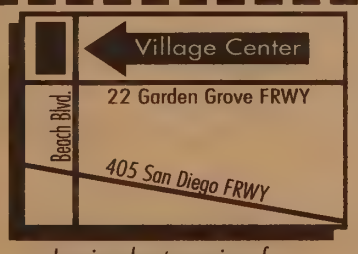

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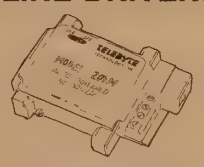

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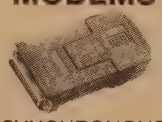

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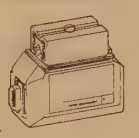

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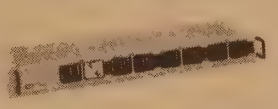

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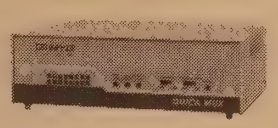

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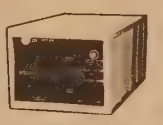

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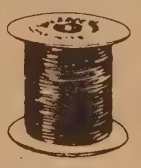

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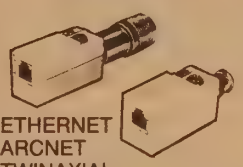

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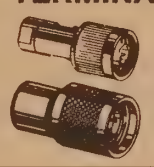

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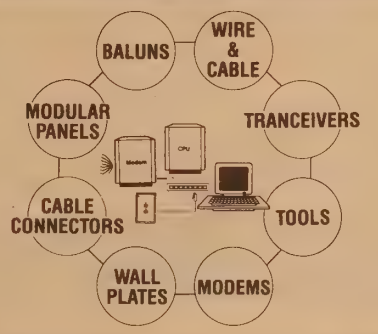

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Setting Up Your Network—

A Cautionary Tale Of Compatibility Concerns

BY WAYNE A. YACCO

LOCAL AREA NETWORKS

Local area networks come in a variety of sizes and prices. Not all of them are designed for large-scale users or require substantial investments of time and money. Naturally, smaller networks trade off some features to achieve savings. Larger networks typically offer far more sophistication—everything from email to management tools for controlling resources and users' access, passwords and privilege levels. They are often faster and serve more users.

THE INVISIBLE NETWORK—A LOW-COST ALTERNATIVE

However, smaller systems for the PC, like the Invisible Network from Invisible Software, have definite advantages. While Invisible sells a standard Ethernet adapter that runs its system at 10 megabits per second (mps), it also has boards at $215 and $315 that can operate over double twisted-pair wire at 1.8 and 3.0 mps respectively. Invisible sacrifices some speed for its less expensive adapters and its network software can only handle 45 users—about half of what NetWare supports. But all of Invisible's adapters are NETBIOS compatible and run network versions of software that support this popular protocol. In addition, other NETBIOS network software like IBM's PC LAN and Novell NetWare can also run on them.

Copyright © 1990 by Wayne A. Yacco. All rights reserved. *Wayne Yacco is editor-in-chief of Vulcan's* Computer Buyer's Guide. *An editor, writer, and consultant specializing in microcomputers and their business applications, he writes articles, columns, and reviews for many trade and business publications. He can be reached at Box 269, Burbank, CA 91503.*

Invisible's network software, Net/30, is an example of a peer-to-peer network. Peer-to-peer networks have nodes with equal network capabilities. That means that any node can serve any other. Any node can obtain data from any other. Net/30 allows you to decide whether a node will be a server, a requester, or both.

The price for any of Invisible's boards includes the company's Net/30 network software and utilities. Everything from network diagnostics to email to print spoolers to management utilities is included. That's already inexpensive, but there's more—the twisted-pair wire is the same type of conductor that telephones use, and it's not only cheap, it's relatively easy to install. In fact, the whole system is easy to install. It runs as an extension of DOS and uses DOS file management. Disk drives don't have to be reformatted. Net/30 runs on machines with far less than 640 K, and only requires about 32 K in addition to DOS. It's perfect for PCs and XTs.

REAL-LIFE COMPATIBILITY PROBLEMS

Despite all this simplicity, computer communication is not as simple as it could be. There are always potential compatibility pitfalls with memory addresses, interrupts, and DMA channels that can be in use with other peripherals. This is especially true if you're using older equipment that either wasn't built with communications in mind, or wasn't built to exactly copy the IBM PC, or both.

I had a choice of five computers, of various PC and XT types, for a hands-on look at the Invisible Network. I went to work setting up the network on a pair of Compaq Model 1 portables.

The first problem I ran into was a very old system BIOS on one of the machines that didn't perform a BIOS scan. The network didn't automatically load on that machine, so I compensated by running the executable version of the network program. But even though everything installed correctly on each machine, the network couldn't send messages between them.

It might have been a cabling problem. That, along with incorrect switch settings, is the most common difficulty users experience. But at the behest of Invisible's head of marketing I ran the diagnostics, and the tests ruled out a cable problem. It was probably a hardware conflict rather than a defective product, but without a spare board, there's no easy way to check.

The Invisible network adapter I had, the Model 200, was designed for machines with an 8-bit bus. It would allow me to select different interrupts or to run the operating system from either RAM or ROM memory (changing the DMA channel requires an AT-class machine and a Model 300 card). I tried a setting that prevented the cards from using the software from ROM. Now both were running in RAM, but it didn't help. Since neither Compaq had a serial port, I didn't bother to try changing the interrupt from 2 to 3.

Next I tried replacing one of the Compaqs with a Vendex Turbo 888 XT. This is a fairly new compatible, but it didn't solve the problem. I replaced the other Compaq with an Eagle Spirit portable. Nothing. I tried turning off the turbo speed. Nope. Vendex is fairly compatible, but the machine has a pair of built-in game ports that can't be disabled, and I suspected they were conflicting. I tried changing the interrupt, but the workstations still couldn't poll remote machines.

The last machine I tried was another Eagle Spirit. Eagle is long dead, and its machines weren't known for their compatibility even

If you plan to install any network adapters in a compatible computer, there are several precautions that you should take. Be sure that the interrupts, DMA assignments and I/O usage are completely standard. Look for machines that say they are network compatible. Don't expect them to work otherwise.

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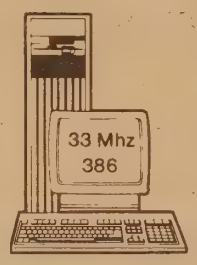

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before the firm's demise. However, both of these machines had a replacement BIOS chip developed by Allen Wilkinson of Wilkinson Micro in Irvine. They make the Eagle compatible enough to run just about anything. I've used them in these and other Eagle machines with complete confidence. But not with these cards. I tried the BIOS in RAM and in ROM, interrupt 2 and interrupt 3. The Eagles couldn't fly. My last shot was a mix of an Eagle and a Compaq, but by then I was whistling in the dark. It was unlikely to help, and it didn't.

A couple of standard IBM PCs could have solved my problems in a minute. That, after all, is what any developer uses to test his product. The boards

If you experience difficulties, the first thing to do is start with bare machines. The more heterogeneous your network is, the more difficult the debugging task is likely to be.

would probably have worked just fine on an inexpensive overseas clone, too; the makers of cheap clones can't afford innovative research, so they copy very carefully.

LEARNING FROM EXPERIENCE

These problems are going to be magnified in more complex networks. If you plan to install these, or any other network adapters in a compatible computer, there are several precautions that you should take. Be sure that the interrupts, DMA assignments and I/O usage are completely standard. Look for machines that say they are network compatible. Don't expect them to work otherwise. Consider every enhancement, every peripheral, and every device you plan to add. Processor speed may be a factor. Scanners, hard disks, CD-ROM drives, tape drives, modems, even extra serial ports, may cause problems.

If you experience difficulties, the first thing to do is start with bare machines. The more heterogeneous your network is, the more difficult the debugging task is likely to be. Once the network is running, add options back into the system until you find the conflict. If it is an essential component, you'll have to either solve the problem or take the device off the network. ■

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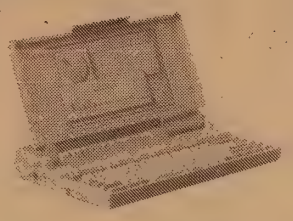

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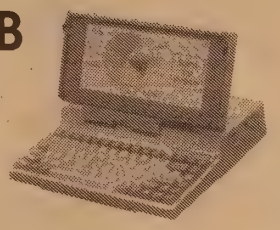

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Choosing The Right PC Database For Your Business

BY CRAIG BOBCHIN

Although the largest use of PCs in the office environment has been spreadsheets and word processing, the database management system, or DBMS for short, is the mainstay of most businesses. This article will examine your options in choosing a DBMS and help you make a wise decision.

FLAT-FILE VS. RELATIONAL

In the world of computers there are two types of database systems: flat-file and relational, or multi–file.

The phone book is a good example of a flat-file database. A flat-file consists of data organized as a table (see Fig 1). The flat-file is unable to read any information from any other file, regardless of whether the other file has any information that is needed. Flat-files work best as phone books and mailing lists. Some examples of flat-file programs are Q & A, PCfile, Rapidfile, and Reflex.

The other major type of DBMS is called relational or multi–file. The main advantage of a relational database is the ability to look at and update data from files other than the one you are working on.

Suppose you have a database table of employees in your office, and that it contains data such as the name, age, address, dependents, etc., of the employee. Let's imagine that you want to know about the department a certain employee works in. You could store all of the department information (e.g., manager name, location) in the same file as the employee information, but since you would probably have the same information in several records, you would be both duplicating data and wasting precious disk space (see Fig. 2). You'd also be running the risk of having conflicting versions of the same information.

A more efficient method of handling such a situation would be to store the department information in a separate table and read from that table when needed (see Fig 3). If the data is stored in this fashion, there is less redundant (and possibly inconsistent) information, and less disk space wasted.

The majority of relational databases are programmable: it is possible to write a program or group of programs to accomplish many and varied tasks, such as retrieving information, or error checking during data entry. Some relational packages are dBASE III and IV, R:BASE, Paradox, and Revelation.

WHICH ONE'S FOR YOU?

Which one do you purchase? That depends on your needs. If you need just a phone or address list, a flat-file system is all you need. But if your needs are more complex—for example, if you want to automate your accounts payable system—you'll probably need a programmable relational DBMS.

A great deal of your decision may also be based on your budget. The more complex and sophisticated the program, the more expensive it's likely to be. When evaluating the costs of a DBMS, don't forget to factor in the hidden costs—learning time, development time, and costs for outside consultants if needed.

This section is a brief overview of some of the more common programs in each category. The examples here are not meant as reviews, just examples of the type of programs in each category.

FLAT-FILES

Q & A: This is an excellent implementation of what a flat-file database should be. It is easy to set up a database file, and even easier to query it. Symantec has included both a word processor and an artificial intelligence module to assist you in retrieving your data.

The word processor makes mail merges a breeze, and the rest of it is also good. It has all the expected features of a midrange word processor.

The real gem of the program is the Intelligent Assistant. This module is designed to aid you in getting information out of your database file by allowing you to ask your questions in plain English. Imagine you have a database of all your customers in Q & A. Now let's say you want a list of all of your customers who owe you more than $500. All you have to do is issue a statement similar to "List all of the customers who owe me $500.00 or more." The Intelligent Assistant will then examine your command, ask you to double check that it is correct, and then give you a list of all customers who owe $500 or more. The Assistant substantially reduces the time and headaches of programming.

PCfile: Don't be deceived into thinking that only products of big-name corporations can do the job for you. Many smaller companies, including several shareware vendors, also offer high quality software, often at bargain prices. One such company is Buttonware. In addition to PC–Type+ (a fairly good word processor) they sell PCfile, one of the better selling shareware programs on the market.

There are several versions to choose from. Most, if not all, are available on BBSes across the nation as well as at computer swap meets and local shareware distributors. One ver-

Name	Age	Birthday
Jeff	26	10/1/63
Sue	25	6/5/64
Marvin	15	2/12/74
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FIGURE 1

Flat-file databases organize information in table form.

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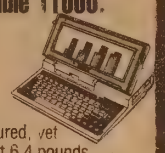

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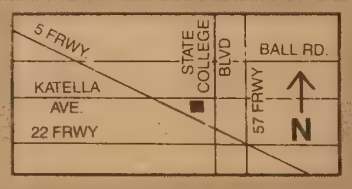

If you just want a phone or address list, a flat-file system is all you need. But if your needs are more complex—for example, if you want to automate your accounts payable system—you'll probably need a programmable relational DBMS.

sion, PCfile:dB, is sold at Egghead Software stores. This program has the ability to read and write dBASE compatible files—a real plus, if all your files from the office are in dBASE format, and you don't happen to own a copy of dBASE. All you would have to do is copy the files you need to a floppy to bring home, boot up PCfile:dB, and you'll be able to query the database, run reports, and even enter new data

Granted, there are no real programming abilities yet, but there have been rumors of a programming language for some time. For affordable dBASE compatibility, you should really take a long hard look at PCfile.

Flat-file databases are all similar in their main purpose, extracting information from a single file. Some programs have the ability to read from, but not write to, other unopened files. This power, while nice to have, does not make a program relational.

RELATIONAL DATABASE MANAGERS

Your boss rushes into your office screaming that he needs all the information regarding the "ABC Widget" sales for the past nine months.

Now, since this is a project involving two others as well as yourself, all of the information is not in the same place. It's scattered in several different file cabinets on your floor. You could go scampering about in search of all of the information needed. Or you could have kept several different databases with all of the information on your PC. However, when it comes time to retrieve all of that information, it could be a minor nightmare.

This is the beauty of having a programmable relational database. With a properly written program, you would be able to enter all of the data into the database as it arrived on your desk, then just run a report based on any criteria that you needed. The data could be in any number of files.

This power does not come easily. It takes some time to learn the programming language and the best ways to relate different files. While there is a learning curve, the more powerful programs will do a significant amount of the programming for you.

dBASE And Friends: Probably the most famous of the programmable databases is dBASE. There are several versions; the most famous is dBASE III. This program became an industry standard, and with good reason. It is very powerful and a fairly easy language to learn.

In the ensuing years, several competitors to dBASE have arisen, chief among them, Clipper and FoxBase. While Clipper is mainly a

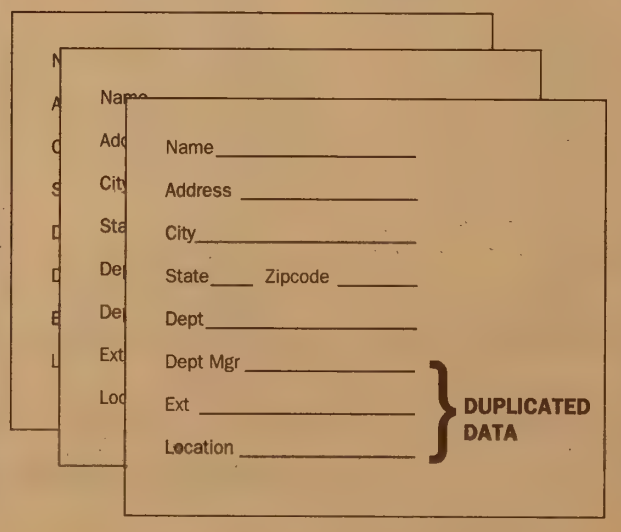

FIGURE 2

If you have several flat-file databases with duplicate information, it's hard to keep it efficient or consistent.

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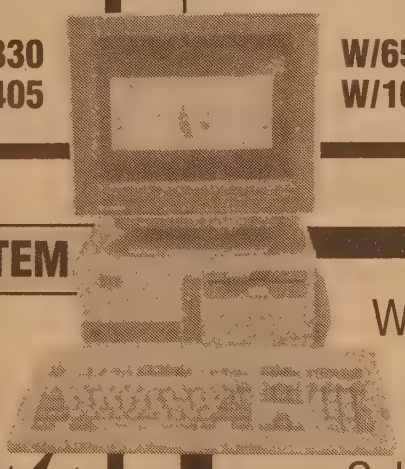

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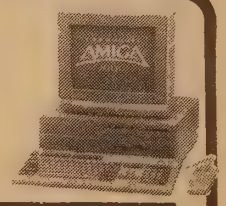

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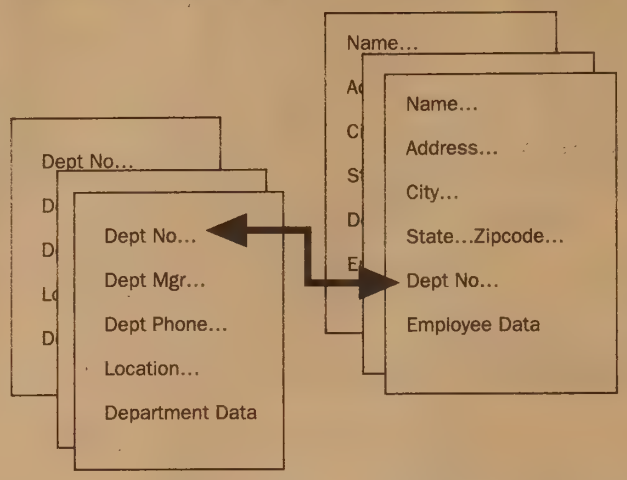

FIGURE 3

Relational databases automatically update the information wherever it occurs.

compiler—that is, a program that will turn dBASE programs into standalone .exe files that do not need dBASE to run—it also has extended the dBASE language to new heights. FoxBase, on the other hand, is a dBASE compatible applications environment. It will do anything dBASE can do, just a whole lot faster.

Many people have switched from pure dBASE to FoxBase or Clipper for the advantage of running all of their old programs without the constraints of dBASE. Fox Software has recently released a dBASE IV-compatible program called Foxpro, which is faster and has far fewer bugs in it than dBASE IV.

R:BASE: Chief among the competitors to dBASE is a program called R:BASE, by Microrim. R:BASE is a very powerful DBMS. It is not dBASE compatible, but is able to import and export to dBASE files.

R:BASE has a very good Prompt by Example mode, where you can design your database by menu selections. It also has an applications generator that will the free up the programmer by writing the majority of the code for you. You will still need to write custom programs to do special tasks.

While the application's interfaces are not as showy as those done by dBASE IV, they do run faster. R:BASE also has one of the best implementations of SQL (SQL, pronounced "Sequel," is an industry standard database query language). If you currently use SQL, R:BASE will be easy to learn.

Since Microrim has released a true compiler *a la* Clipper, you can turn your R:BASE programs into standalone programs that will not require R:BASE to run. As an alternative to dBASE and its clones, R:BASE is worth a look.

REVELATION AND ADVANCED REVELATION

From the world of minicomputers comes a database program based on a very powerful operating system: Pick. The program started as an operating system on minicomputers. In the early '80s it was licensed by Cosmos (Revelation Technologies) and released as Revelation.

Revelation is a very powerful DBMS. Revelation and Advanced Revelation (AREV) allow for a record size of 64 K—64000 bytes in each record. dBASE IV, by comparison, can have a maximum record size of 4 K. Both REV and AREV come with application and screen generators. AREV is by far the easier product to work with.

The main programming language is R/Basic, a proprietary version of the BASIC language not compatible with any other version of BASIC that is sold. If you need to store a lot of records and those records are large, you may want to consider Revelation or Advanced Revelation.

MAKING THE FINAL CHOICE

For many people the choice is obvious. They go with dBASE. But whether you need a flat-file database or a programmable database with relational capabilities, you have a large variety to choose from.

Before you spend any money on a program, talk to people who have used it, and, if possible, get a demo version from the manufacturer. This way you can get a feeling for the program's compatibility with your needs and work style. ■

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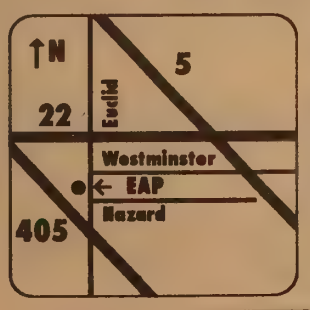

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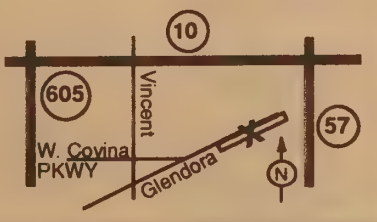

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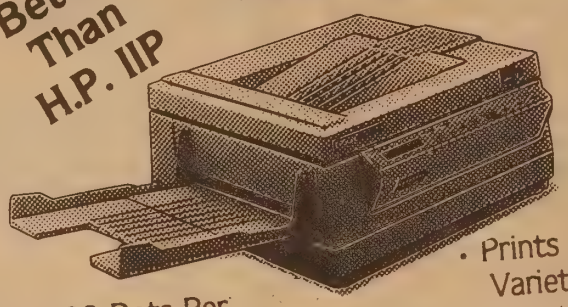

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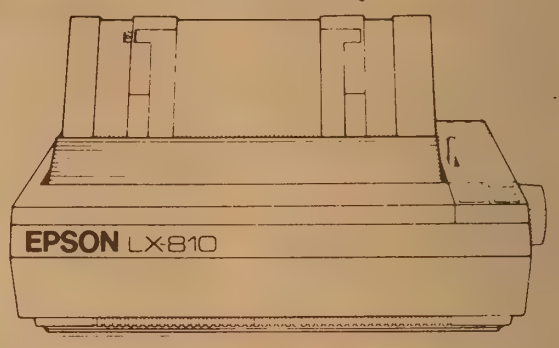

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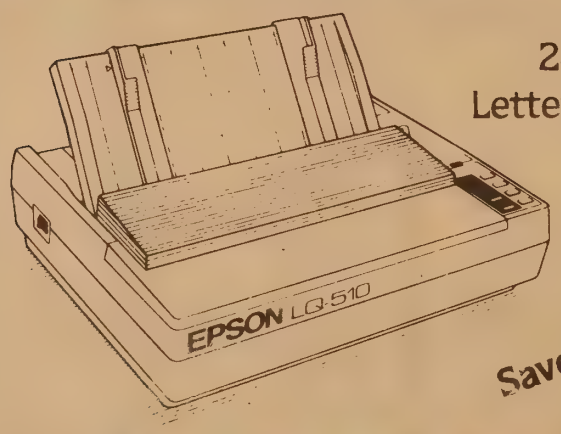

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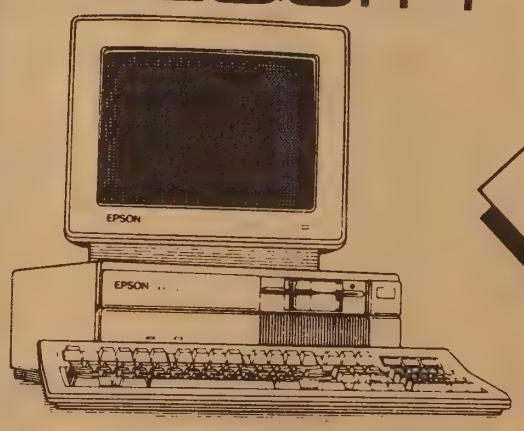

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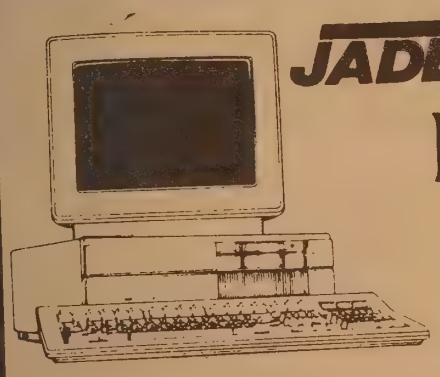

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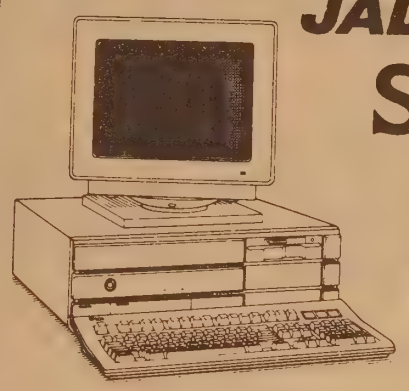

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SECOND OF TWO PARTS

Object-Oriented Languages

An Overview

By Birrell Walsh

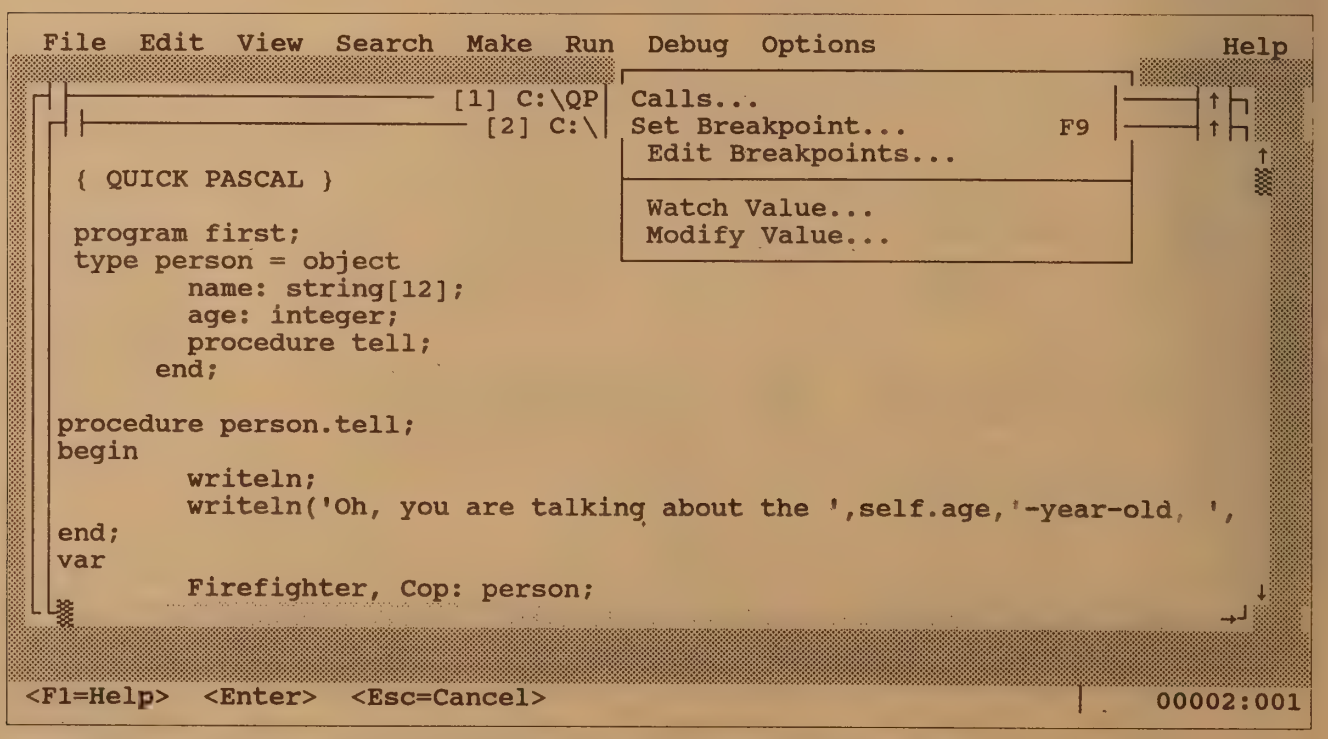
Last month we talked about the philosophy of object-oriented languages. You'll recall that they have several characteristics, called "Encapsulation," "Inheritance" and "Polymorphism."

Objects are an extension of the idea of data-structures, which includes not only data but also functions and procedures. "Encapsulation" means that objects hide both data and procedures inside them. In a fully object-oriented system, data can be obtained from an object only by using a procedure from the same object. Each object handles its own input and output to the system, and becomes in effect a mini-program. Encapsulation gives superb data security.

"Inheritance" means that new classes of objects can be made out of old classes of objects. The new objects have all the data-structures and the procedures of the old objects—"by inheritance"—in addition to special data and procedures specific to the new object. Inheritance means that old programming can be reused; object classes are the model for new objects.

With "polymorphism," different objects can respond with different behavior to the same command. The languages have "many forms" of responses to the same symbol. In most languages, integers and "floating point" (or "real") numbers respond to arithmetic commands similarly, even though they are really quite different kinds of numbers. That is polymorphism.

With full polymorphism in an object-oriented language, you as the programmer can invent new kinds of data types and teach them how to respond to commands. You might create a class of complex numbers whose members have two numbers each (the real and the imaginary components). In a fully object-oriented language, you can write special procedures for the class of complex numbers which allow you to add, subtract, and multiply the numbers. You can use the same symbols (+, -, and *) that you use for addition, sub-



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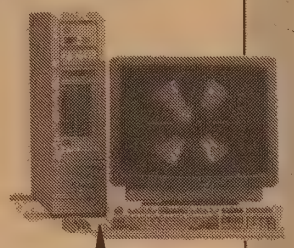

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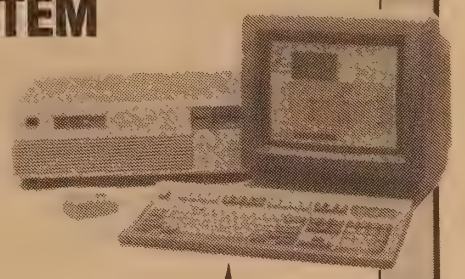

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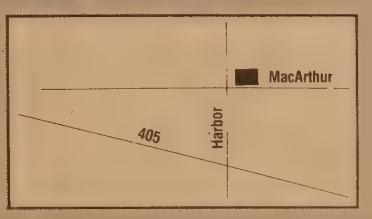

Since Smalltalk won't let you fall back on the procedural programming to which you may be accustomed, you are forced to think in terms of objects. Work in Smalltalk will teach you the concepts of OOPS faster than any other language.

traction and multiplication for other numbers. The language will respond one way if the objects on either side of the "+" are integers, and a different way if they are complex numbers.

OOPS are intended to give excellent data security, a great deal of flexibility, and reusable code. They also allow a project to be broken into many subprojects, with each team working on the objects of that subproject.

This month we will look at specific languages that embody this philosophy. Only a few of the languages have all the object-oriented features implemented. Some do not have fully encapsulated objects and data security. Others have not completely implemented polymorphism. All of them have at least the property of inheritance.

Smalltalk

Smalltalk is the oldest of the object-oriented languages in wide use. Smalltalk is also a parent of the graphic interface, dating back to Xerox PARC.

Smalltalk is more than just a pretty face. It has developed speed and power over the years, and been ported from mainframes and minis to microcomputers. We examined Smalltalk/v, Digitalk's full implementation of the language.

The other languages examined here make objects optional, because they are object-oriented extensions of existing languages. In Smalltalk/v you *must* use objects, because the only things that exist in Smalltalk are objects. Characters, strings, integers, real numbers, graphic entities—all are objects that send and receive "messages." "Messages" are requests from one object that a second object run a procedure and return the results.

Smalltalk is surprising the first time you use it, because you do not exactly "write a program." Instead, you build object classes that will meet your needs, and objects made from those classes act as your agents. Since you cannot fall back on the procedural programming to which you may be accustomed, you are forced to think in terms of objects. Work in Smalltalk will teach you the concepts of OOPS faster than any other language.

If you wanted to work on a problem that involved things organized in a ring, for instance, your first act in Smalltalk would be to create an object of that name. You would not start writing code immediately. Instead, you would open a window called "the class hierarchy browser." It lets you look at all the classes of objects that are already defined. You would be searching for an object similar to what you want that could serve as a "parent" for your new class.

Say you chose the "list" as a parent. You would make rings be descendants of lists, and the Browser would show the parentage in the hierarchy of objects. Then you would modify the procedures of the new class until you had a working ring-object. Some of its abilities would be like its parent, the list. Some would be unique to it.

Since Smalltalk's way of thinking is new to most programmers, we can be grateful that there is an excellent tutorial with many examples included with Smalltalk/v. You can learn this most object-oriented of all languages step-by-step.

Smalltalk/v is available for both the Mac and DOS machines. You can create objects that are portable between the machines. In fact, you could network the machines together and let them work together in a two-platform Smalltalk environment. I for one wish that Smalltalk/v were the common operating-system/language for both machines.

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{ TURBO PASCAL }                                  Delete watch
                                                  Edit watch
{///////////////                                  Remove all watches
//
// The object "location"                          Toggle breakpoint  Ctrl-F8
//                                               Clear all breakpoints
///////////////}                                 View next breakpoint

type location = object
          x,y:integer;
          procedure Init(InitX, InitY: integer);
          procedure SetX(NewX: integer);
          procedure SetY(NewY: integer);
          function GetX: integer;
          function GetY: integer;
     end;
procedure location.Init(InitX, InitY:integer);
                                    Watch

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Borland's latest Turbo Pascal, 5.5 is the language of choice for many developers.

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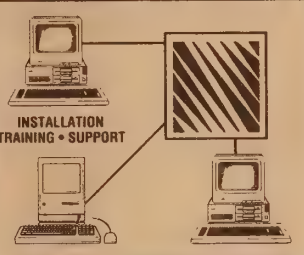

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Objects which inherit from a parent object will inherit the definitions their parents had for variables and functions, just as a citizen of California inherits federal rights through citizenship in the state of California.

Turbo Pascal 5.5 And Quick Pascal

While Smalltalk requires the programmer to use objects, other languages merely permit it. In most cases, those languages are traditional programmer's tools with an object facility added.

Turbo Pascal 5.5 from Borland and Quick Pascal from Microsoft arrived on the market simultaneously. Both permit, but do not require, the programmer to use objects in program design.

The genealogy of these two languages is complex: Microsoft already had a Pascal when Philippe Kahn of Borland came along and marketed his wildly successful, low-cost Turbo Pascal for DOS (November 1983). Meanwhile, in another area, Apple was marketing Object Pascal for the Macintosh. Microsoft decided to market Quick Pascal, a clone-plus of Turbo Pascal. It is a clone because it will run most Turbo-Pascal code. It has an object-oriented extension based largely on Object Pascal—that's the "plus." Then Turbo Pascal came out in its version 5.5, with a different object-oriented extension based in part on Object Pascal and in part on C++, an extension of C. Both Quick Pascal and Turbo Pascal 5.5 are compatible with Turbo Pascal 5.0, but not with each other. Neither is compatible with Microsoft's old Pascal. Quick Pascal from Microsoft is cheaper than the formerly low-cost, now midrange Turbo Pascal, and of course cheaper than Microsoft's own Microsoft Pascal, which is no longer Microsoft's only Pascal. Got that?

The result is that there are suddenly two object-oriented Pascals in the marketplace for DOS machines. Both are good. I would give Microsoft a slight edge for interface and a large edge for help facilities. Borland's Turbo Pascal 5.5 is a better language overall, with better documentation; it is likely to be supported by more third-party developers. Borland includes a book with Turbo Pascal 5.5 which is a *superb* introduction to the whole idea of object-oriented programming.

The new Pascals can be used without objects if you choose. If you do choose to use objects, you define them as a new sort of record. The record has the customary data fields. In addition, the record has functions and procedures. Calls to those functions and procedures are the equivalent of the messages of Smalltalk. Instead of saying

StartingPoint show

as in Smalltalk, you would say

StartingPoint.show

using the dot notation which Pascal uses for records. In Turbo Pascal 5.5, objects can be stored in the data segment or be dynamically allocated. In Quick Pascal, they can only be dynamically allocated.

Neither Pascal enforces data-hiding. That is, you can read the contents of an object's data without using the object's own functions. If you want to know the value of StartingPoint's X coordinate, you can just say **"i := StartingPoint.X"** as with any other record. I judge this to be a serious deficit in both languages. It means a breach in data security. The re-definition of operator names—polymorphism—is limited to function and procedure names. You cannot redefine "+" for a new data-type, as you can in Smalltalk, C++, and Lisp.

If you are a user of Turbo Pascal, these Pascals will allow you to try out the concepts of object orientation and still keep all of your old code. If you are new to object-oriented languages and wish to learn good OOPS habits, neither Pascal will provide the best opportunity. Data security is leaky and polymorphism is limited.

Turbo Pascal 5.5 $149.95

Turbo Pascal Professional $250 (includes Turbo Assembler and

```
File Move Edit Blocks Delete Search Other Record Playback Text 1 2 3 4 5
cOmpile Compare Dos Print                                        no file 1
──────┬──────┬──────┬──────┬──────┬──────┬──────┬──────┬──────┬──────┬──────
// ZORTECH C++ Compiler                  ┌──────────────────────────┐
                                         │cOmpile                   │
///////////////                          │Compare                   │
//                                       │Dos                       │
// Define the class "dot"                │Print                     │
//                                       │eXit                      │
///////////////                          │1                         │
→                                        │2                         │
class dot {                              │3                         │
→         fg_coord_t x, y;               │4                         │
→         int energy;                    │5                         │
→       public:                          │Compile the program in    │
→         void move_to(fg_coord_t, f     │this buffer               │
→         };                             └──────────────────────────┘
→
void dot::move_to( fg_coord_t newx, fg_coord_t newy)→    {
→       int i, j;
→
// First erase where it has been:
→
→       for ( i = x - 1; i <= x + 1; i++ )
```

Zortech's C++ compiler offers a full range of object-oriented programming tools.

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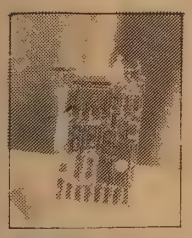

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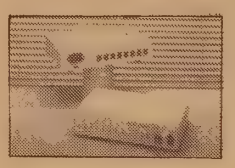

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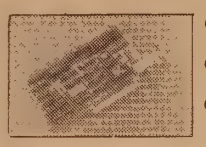

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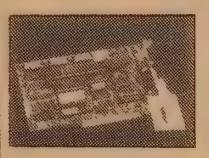

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C++ is fully polymorphic. It allows you to redefine not only functions, but also operators like "+" and even "()." You can, of course, make a terrible mess by redefining "+" as a form of subtraction, but C programmers are used to this sort of freedom.

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4585 Scotts Valley Drive
Scotts Valley, CA 95066

Quick Pascal 1.0 $99
Microsoft Corporation
16011 NE 36th Way
Box 97017
Redmond, WA 98073-9717

LISP

Common LISP is the language of choice in the artifical intelligence world. The version reviewed here is Allegro Common LISP, from Apple Computer. I spent some time talking with Apple LISP programmer Andrew Shalit about object-orientation in Apple's Allegro Common LISP.

LISP is not like other languages. It is so powerful and flexible that LISP programs often rewrite themselves. Data-types are redefined in mid-program. Much of what goes on in LISP involves keeping track of the environment in which you are working. The "scope" of a variable or function is the set of environments in which it is defined. Variables and bindings are defined in the block of code they occupy (lexical scoping) and in the part of the program which is running (dynamic scoping). Objects in Allegro Common LISP are another kind of environment, and provide another kind of scoping.

Objects which inherit from a parent object will inherit the definitions their parents had for variables and functions. Descendants share their parents' definitions because they exist in the environment of their parents, just as a citizen of California inherits federal rights through citizenship in the state of California. They also have special rights they get from the California constitution, which Arizona and Oregon citizens do not share. You can use objects as specialized environments in which different definitions can be true.

Apple's Common LISP has "multiple inheritance." If you have defined the class LAND-CREATURE with the function WALK and the class SEA-CREATURE with the function SWIM, then in this LISP (though not in Smalltalk or the Pascals) you can define a class AMPHIBIAN which inherits from both LAND-CREATURE and SEA-CREATURE. It can both WALK and SWIM. This means that you can define classes of objects as packages of abilities, and then mix those abilities in other objects.

Apple Allegro Common LISP also allows you to redefine objects after they have been created. The other languages discussed here could not do such a thing: an object has its "nature" derived from its class, and that is that. In this language things are more fluid. An object SALAMANDER might begin as a SEA-CREATURE, transform into an AMPHIBIAN, and end as a LAND-CREATURE. It could keep its identity the whole time. You can imagine the power that this conceptual scheme lends to simulations. It is part of the attraction LISP holds for artificial intelligence developers.

Apple Allegro Common LISP $495
APDA
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014

C++

At last we arrive at C++, in the guise of Zortech's compiler. C++ was created (like C before it) at AT&T's Bell Laboratories. C++ was designed as a superset of the C language.

Data- and function-hiding can be as complete as you wish in C++. Data and functions inside of an object can be defined as private, protected or public. If they are private, they are not accessible at all outside of the object. If they are protected they are available only to descendants of the object. If they are public, they are available to all. You can also define "friend" classes and functions that have access to each others' private data and functions.

C++ lets you maintain full data security. C++ also defines class variables—variables the class keeps, rather than having them present in each of the members. An example: A class might use class variables to keep track of how many members it has or how many times each of its functions were invoked in its members. Smalltalk and LISP have this feature; the Pascals do not.

Inheritance in C++ is relatively straightforward as long as the "protected" data-class is implemented. If it is, then descendants can inherit their parents' data-types without further contrivance.

C++ is fully polymorphic. It allows you to redefine not only functions, but also operators like "+" and even "()." You can, of course, make a terrible mess by redefining "+" as a form of subtraction, but C programmers are used to this sort of freedom.

Because C++ has all the features of object-oriented programming and also includes the familiar and powerful C language, it is certainly the OOPS of the future. Apple has already settled on C++ as the system language for future Macintosh system programming. Microsoft is hard at work on a version of C++ for (reported) release in 1990. Borland is saying "no comment" in a promising tone of voice. This is the language to learn if you want a sure thing in the object-oriented world.

Zortech has presented us with a full implementation of C++ in version two of its compiler. They comply with the new C++ version two standard from AT&T. Their language is very fast. The graphics are excellent. It has a largely integrated environment, with a compiler that can be called from the editor.

It is also a true compiler. Many other C++ versions are "precompilers." They convert your C++ code into C, which they then compile or pass to another compiler. Zortech compiles directly from C++ to machine code.

In addition to the basic language, which includes graphics, there is a source-level debugger available for developers. There is also a family of classes being sold as "C++ tools." Royalty-free source code is provided for the objects with the tools.

Zortech has had earlier versions of C++ (based on earlier standards from AT&T). Those have served the C community well, but this is a major revision. Version two of the language brings multiple inheritance to the C world. Zortech has also improved its own implementation and interface. The editor and compiler are better integrated than in earlier versions. The few bugs I found are fixed in this version, and the error messages are much more useful. I predict that Zortech will gain a major share of the object-oriented C market from Microsoft and Borland, because Zortech is ready now with all the tools of object orientation while Borland and Microsoft are still circulating rumors. Zortech C++ version 2 is a good product.

Zortech C++, version 2 $199
C++ Tools $149.95
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Developer's Kit (all of the above) $450.00

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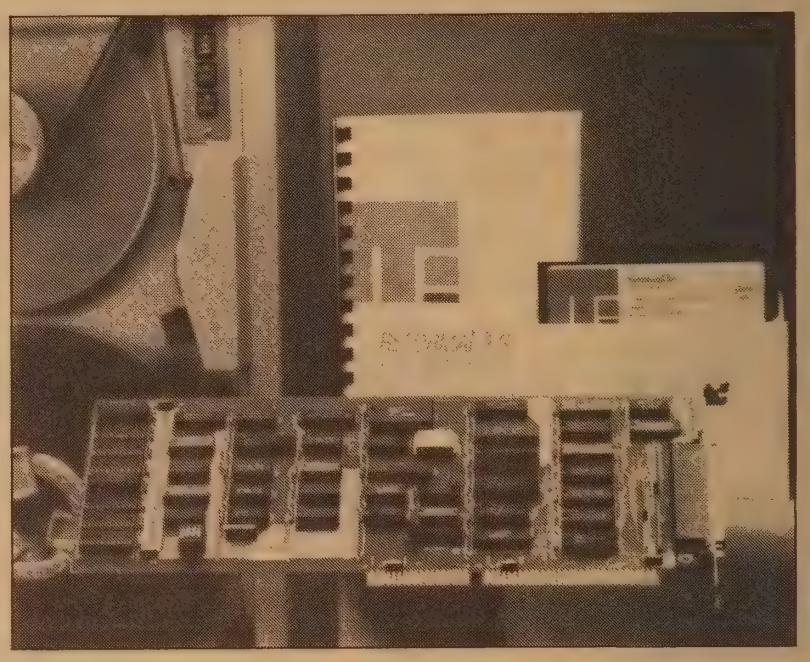

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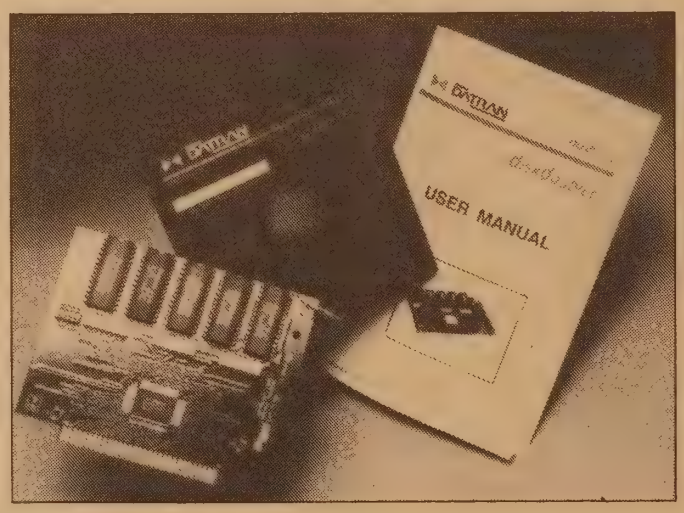

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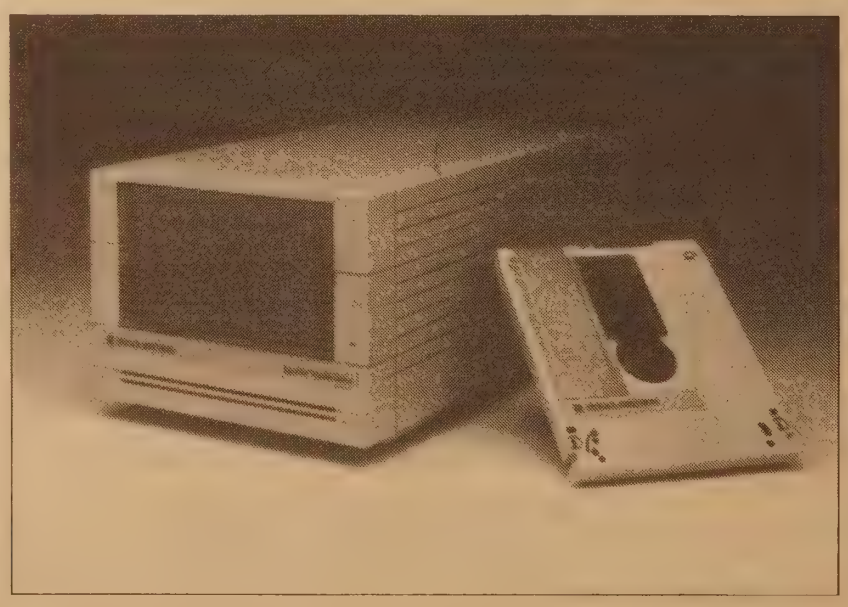

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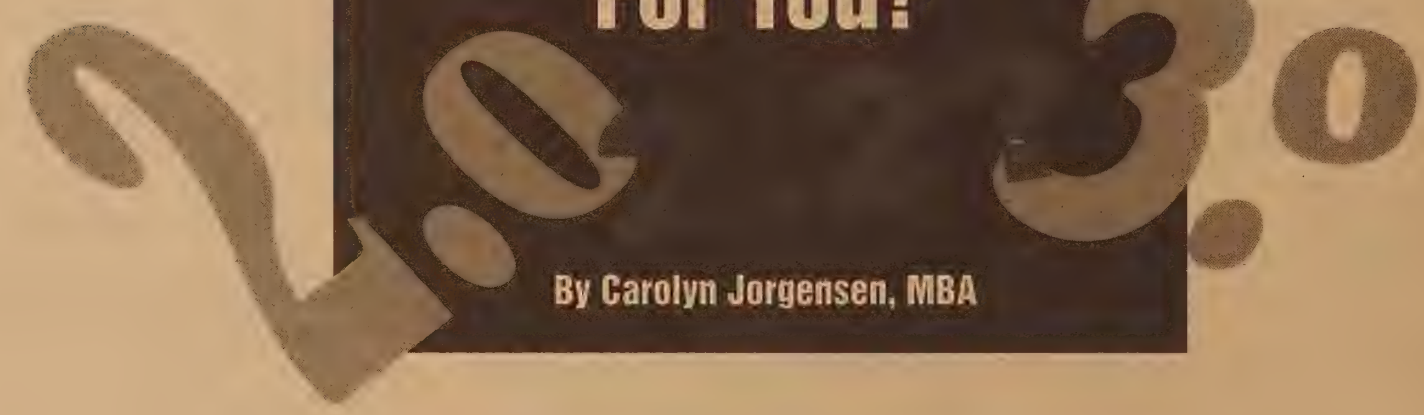

By Carolyn Jorgensen, MBA

Many Lotus 1-2-3 users have been asking themselves, "Do I really need to upgrade to another version?" Since it will take any user some time to learn all the new features offered by Release 2.2 and Release 3.0, it is a good idea to identify those features before making the purchase decision—an investment of $150 if you currently own 1-2-3 Release 2. How can you determine the value of the upgrade, and decide which version's for you?

- Survey the features each version offers—do you have a clear understanding of what each offers?
- Examine your current applications—do they indicate one version over another?
- Plan your future needs—are there projects you want to implement that you can't do with your current version?
- Inventory your current computer's configuration—can it work with either version?

All these factors play an important role in your decision to upgrade. To understand what each version is about, you need to first study a list of features that each offers.

Actual unit sales of 2. and 3.0 are, of course, difficult to pin down, but according to one nationally known software vendor, January 1990 shipments of 1-2-3 Release 2.2. and 3.0 were almost identical. This makes it difficult to discern clear trends as to which version users are buying.

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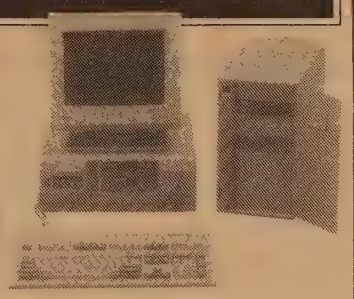

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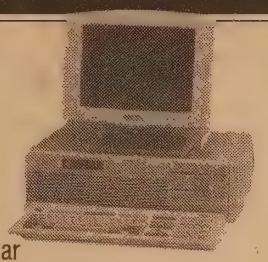

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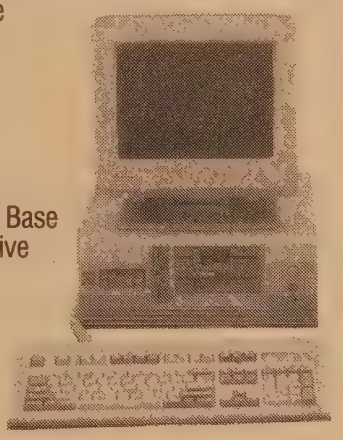

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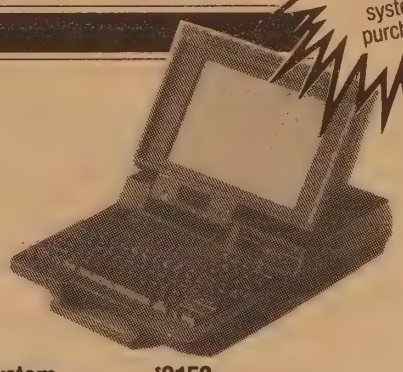

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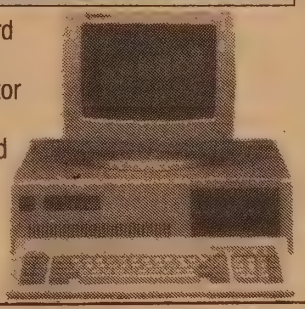

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Why Two New Versions?

To view both products objectively, you first need to recognize that Release 3.0 is Lotus's intended "power" version. But with that power comes the hardware requirement for a 286 or higher machine. This alone encourages users of lower-powered computers to steer away from the product.

Many technical support people are overwhelmed with the idea of supporting two versions of 1-2-3, and if the base of users limited by hardware is significant, they may not allow more powerful users to upgrade, or offer little support. However, these users needed new features as their applications grew, regardless of their computer. For that reason, Release 2.2 was issued as an alternative to 3.0.

Mixed Bag Of Features

Although both versions offer new features that overlap, common terminology is used to describe features not necessarily identical in both versions. This has confused many users into making no choice at all, or into choosing 2.2 merely for its resemblance to 2.0 in the area of memory utilization and .WK1 file structure.

Table 1 shows a list of features identical in each version. The following are features that are similar but not identical in the two versions.

File Linking

Both 3.0 and 2.2 offer file linking. However, 2.2's capability is extremely limited. With 2.2 you can link only one cell from another file at a time. 3.0 offers the ability to link almost every possible formula you can build, including @ functions such as @SUM.

Let's say you want to build a file that combines data from three divisions into one total. With 2.2, you type three formulas, one per cell:

```
+<<div1.wk1>>a1
+<<div2.wk1>>a1
+<<div3.wk1>>a1
```

and then an @SUM function to add all three cells.

In Release 3.0, you type one formula, such as:

```
@sum (+<<div1.wk1>>a1,+<<div2.
wk1>>a1,+<<div3.wk1>>a1)
```

This one formula adds all three cells from each file at once. Note that with 2.2, you will need a second formula to total each linked cell. If your application is only linking a few cells, this is sufficient. But if you need to link several cells, this approach uses more memory; a spreadsheet file takes up more memory as the number of formulas increases.

File Windowing And Three-Dimensional Capabilities

File windowing is another feature that both offer. How often have you been viewing one spreadsheet file and needed to look up data from another? Release 3.0 allows you to retrieve multiple files and modify one or more, keeping as many as three files onscreen for a true 3-D effect. A 3.0 file can contain up to 256 sheets or layers; 2.2 still is limited to one.

Release 2.2's file windowing capability is limited to two files and is shadowed in its method of using the Undo command. To view two files at the same time, you retrieve file A, retrieve file B, and press the Undo key. This toggles the screen back to file A; another keystroke toggles back to file B. This method works as long as you have enough RAM to load both, but doesn't allow you to toggle back after a change that invokes READY mode.

How often have you been viewing one spreadsheet file and needed to look up data from another? Release 3.0 allows you to retrieve multiple files and modify one or more, keeping as many as three files onscreen for a true 3-D effect. A 3.0 file can contain up to 256 sheets or layers; 2.2 still is limited to one.

Graphics

Graphics enhancements are another point of confusion. Lotus claims to have improved both versions' graphics, but in reality has only offered a few new commands to Release 2.2 without improving the visual presentation.

Most reviews state that the presentation is different for 2.2. The only presentation improvement to 2.2's graphics is the adjustment of crowded x-axis labels into a staggered position as shown in the figure. One feature unique to 2.2 not included in 3.0 is the Graph settings sheet that neatly displays all graph settings for a graph but the name. The new Graph Group command in both versions offers an easier way to set up graphs, but no new visual impact.

Release 3.0 offers better presentation through fonts, colors, and shading patterns; the ability to view both a graph and spreadsheet onscreen; instant graphs without having to set up ranges; graph printing directly from 1-2-3, including the ability to print a graph and a spreadsheet on the same page at last directly from 1-2-3; and two ways to save a graph—.PIC format and .GEM format (used by desktop publishing programs). If you are doing a great deal of graphics, Release 3.0 is the best choice to create top quality reports.

Database Power

Database commands, seldom explored by many users, offer the greatest difference between the new versions. Release 2.2 offers a Data settings sheet for Data Sort and Query, unlike Release 3.0. These are a more informational improvement and do not add new command functionality.

Release 3.0 kicks off a whole new dimension in database management—the ability to use relational databases both within 1-2-3 and from external relational files created with dBASE III. Also added is the ability to sort by up to 255 fields. Most significant is the ability to query or select records from 1-2-3 database files on disk, but not loaded into memory.

For example, suppose you have half a dozen divisions with salary information each stored in a 1-2-3 database file. You need to consolidate them into one large file to determine your projected payroll and bonus expense for the company. Before, you would use tedious File

TABLE 1

FEATURES COMMON TO BOTH LOTUS 1-2-3 RELEASE 2.2 AND 3.0

SPREADSHEET

- ✓ Range search command allows you to search and/or replace data in formulas and/or labels.
- ✓ Formulas can reference a cell from a disk-based file.
- ✓ Column widths can be set for a range of columns.
- ✓ Undo can be used to reverse almost any command or entry.
- ✓ Minimal recalculation recalculates cells only if a cell they depend on changes.

GRAPHICS

- ✓ Graph group allows you to set data ranges and legends for all ranges, rather than specifying each range separately.

DATA BASE

- ✓ There are no improvements common to both versions.

FILING AND PRINTING

- ✓ File Backup offers a method of making a backup copy from with 1-2-3.
- ✓ File Admin Table builds a list on the worksheet of files from any directory including size and date/time.
- ✓ File Admin Reservation gives network users a built-in way to limit access to files.

MACROS

- ✓ Macros can have any name less than 16 characters; a big improvement over the former limit of 26 letters and 0.
- ✓ New ACL commands include: BORDERSOFF, BORDERSON, FRAMEOFF, FRAMEON, GRAPHON, GRAPHOFF—used to control screen appearance, and SYSTEM (to invoke the /System command during a macro).

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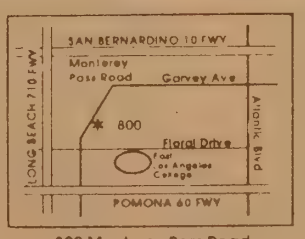

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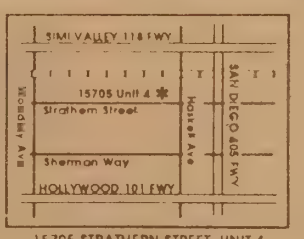

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Combine and range names to cut and paste different columns. Wtih Release 3.0, you can:

- Set up an output area to copy records into a new file;
- Type only specific fields (column titles) to select data from;
- Designate the input range for the query as the 1-2-3 file on disk;
- Set a criterion to select only records from employees earning a certain salary subject to bonus;
- Extract or copy the records with one command;
- Repeat the same for the next range using a new file as the input range.

The power of selecting one or more columns from several files on disk is one not so obvious to the novice user, but can even be programmed using macros so that any user could perform such a consolidation. The source files need not even be Release 3 format—they can be 2 or 2.2. files and the process works all the same.

@Functions Increased

Release 3 offers fourteen new @ functions, such as @VDB (variable depreciation); @VARS, @DVARS, @DSTDS and @STDS to compute statistics for a sample size in a spreadsheet or database; @SUMPRODUCT to multiply then add ranges; @COORD and @SHEETS, to identify new dimensional information such as row, sheet, and column location; @D360, to calculate time periods in a 360-day year; @INFO to describe the current works session such as memory available; @ISRANGE and @ISAPP, to check for a range name and application respectively; and @DGET and @DQUERY, to copy an entry from a

Table 2

SUPPORTED HARDWARE BY VERSION

	Rel. 3.0	Rel. 2.2	Rel.2.0
COMPUTERS			
IBM PC, XT and compatibles	no	yes	yes
IBM AT and compatibles	yes	yes	yes
IBM P/S 2 Model 50, 55-SX, 60, 70, and 80	yes	yes	yes
MEMORY (total installed memory)			
640 K	no	yes	yes
1 Mb (640 K conventional, 360 K extended)	yes	yes	yes
2 Mb (640 K conventional, 360 K extended, 1 Mb expanded)	yes, but doesn't use expanded amount	yes	yes
2 Mb (640 K conventional, 360 K extended, 1 Mb extended)	yes	yes, but doesn't use extended amount	same as 2.2
PRINTERS			
HP Laserjet, +, and Series II	yes	yes	yes
PostScript-driven	yes	no	no
MONITORS			
CGA	yes	yes	yes
EGA	yes	yes	yes
VGA	yes	yes	Will work but doesn't add extra color or resolution

The power of selecting one or more columns from several files on disk is one not so obvious to the novice user, but can even be programmed using macros so that any user could perform such a consolidation.

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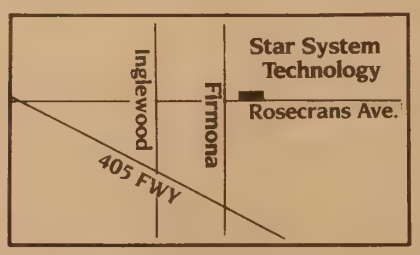

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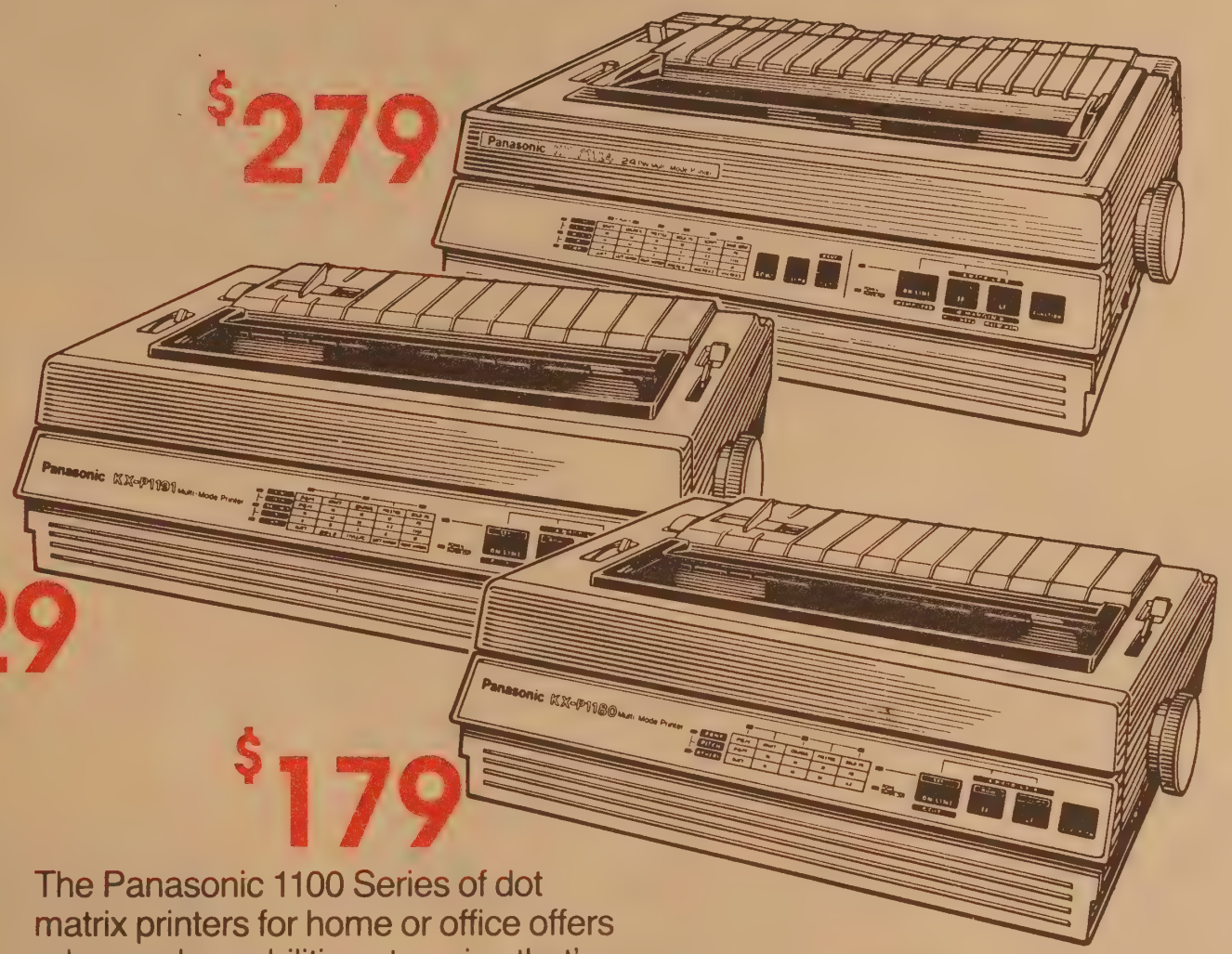

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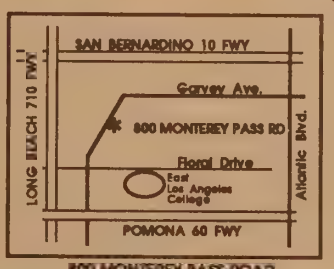

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database using criteria and send a command to an external database program such as dBASE III. Release 2.2 does not have any new @ functions.

Macros

A final area of interest to most users is the macro feature and how each version has improved it.

Although both versions offer the ability to record and edit keystrokes typed, 2.2 requires that you turn the recorder on and off; 3.0 automatically stores the last 512 characters typed continuously.

Another plus is the new macro library feature—2.2 has the ability to load a single file containing commonly used macros into memory through attaching a special utility program or add-in called the Macro Manager. 3.0 offers the built-in capability to load any number of macro files into memory directly without a second program.

Advanced Command Language (ACL) commands unique to 3.0 are APPENDRIGHT and APPENDBELOW, used to automatically extend database ranges during new entry of fields or records respectively. A new FORM command provides a more controlled approach to entering data by assigning keys routines to perform, and allowing or disallowing keys during data entry. A few new other commands in Release 3 move the user within the three-dimensional workspace.

Memory Management

The most important consideration after the CPU type (8086, 80286, or 80386) is your amount and type of RAM memory. If it exceeds 640 K, your computer resides in the world of extended or expanded memory. This type of memory is managed by a special program that conforms to the EMS (Expanded Memory Specification) version, or is often described as a memory management software. It can tell your PC whether to use one type or another. Some can reconfigure it automatically as the application loads; others you must issue a command to do so. A few do not come with the ability to switch from expanded to extended. Check your owner's manual or call the memory card vendor if you are not sure.

Expanded memory is the type most accepted by DOS applications and not usable by OS/2. To date, Release 3.0 is one of the few applications designed to work with extended memory on both DOS and OS/2. Therefore, if you already have this extra memory and are using DOS, most likely it is configured as expanded, since most applications use this type.

Extended memory is also the name given to the memory between 640 K and 1 Mb. Thus your computer has this type of memory if it contains more than 640 K installed.

In conclusion, if your computer has at least 1 Mb of RAM and is a 286-based CPU or above, you can run Release 3.0. To efficiently manage that memory, consult the manual accompanying the memory board. Table 2 shows the memory and other hardware configuration for all releases.

Cost Considerations

The final sum of weighing each factor above is the overall benefit the upgrade can provide. Although you cannot measure it in dollars, productivity, time, and performance add up. The actual dollar cost:

- The actual upgrade will cost $150—either to 2.2 or 3.0.
- A memory adaptor—from a few hundred dollars and up.
- A new computer—other programs can be added to justify the cost or it can be swapped with another user.

Total these cost considerations, and subtract them from your overall benefit. Whether the cost is minimal or great, you will be better prepared to make a decision to upgrade or not. ■

Although both versions offer the ability to record and edit keystrokes typed, 2.2 requires that you turn the recorder on and off; 3.0 automatically stores the last 512 characters typed continuously.

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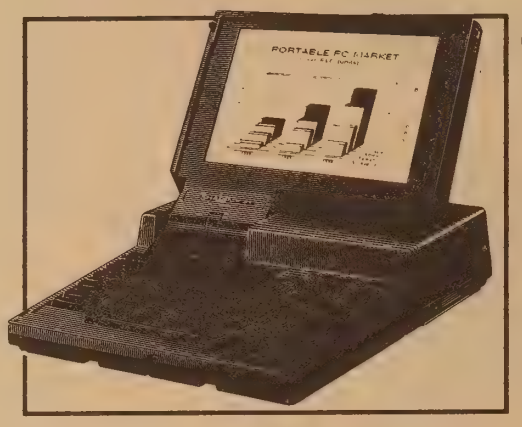

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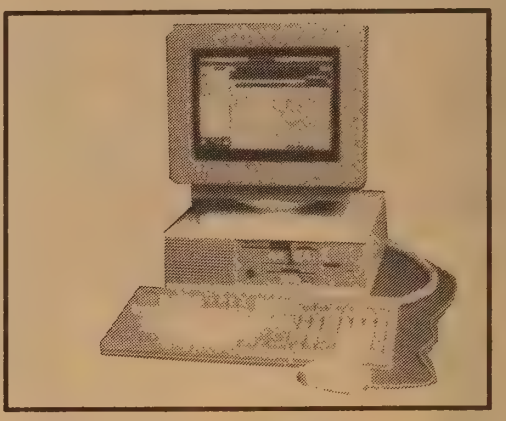

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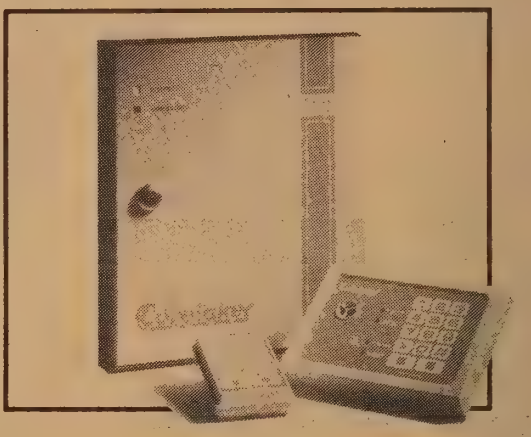

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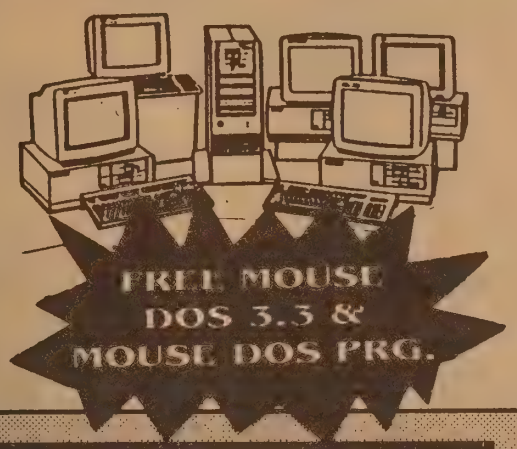

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Part 3

Multitasking With DESQview

Useful Resources, Tips And Tricks

By Lenny Bailes

In the previous two parts of this series, we've focused on the nuts and bolts of setting up a PC to run Quarterdeck's DESQview, and on the benefits DESQview users will derive from Quarterdeck's new memory management products. This part covers leftover odds and ends that you don't find in the manual.

Your Modem Is Your Best Support Tool

Gradually gaining attention as a multitasking front end for MS-DOS, DESQview is now actively discussed in national and international question-and-answer forums. DESQview conferences are carried by SMARTnet/RELAYnet and RBBS/FIDOnet. These two mail exchange networks link hundreds of hobbyist BBSes from North America to Australia.

Running under FIDOnet, DVNet is a loose confederation of nodes which supplements technical Q & A conferencing with DESQview-dedicated file areas. Since more and more people are using DESQview as their "operating system," shareware enhancement utilities have begun to appear. These user add-ons give DESQview even more power than Quarterdeck wrote into the program.

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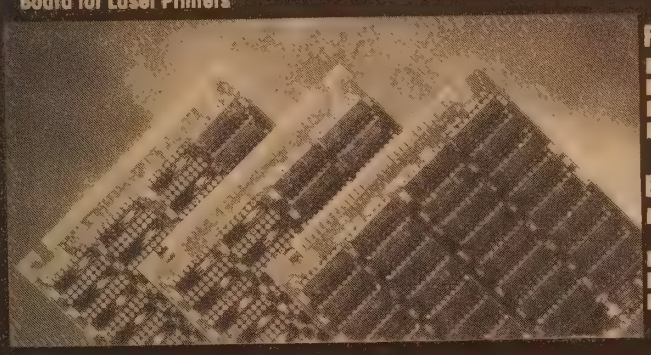

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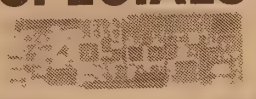

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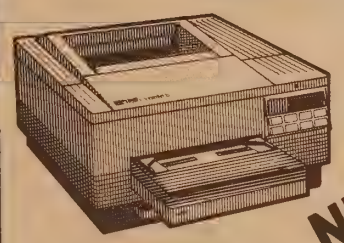

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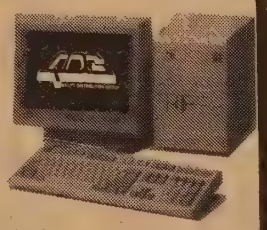

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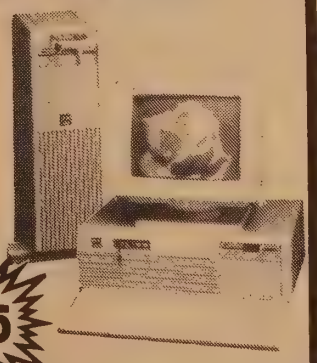

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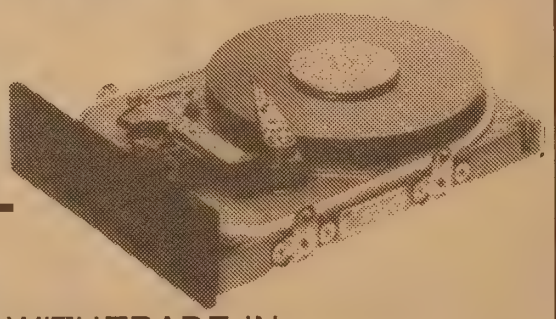

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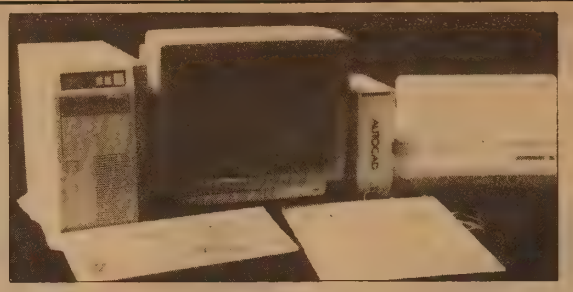

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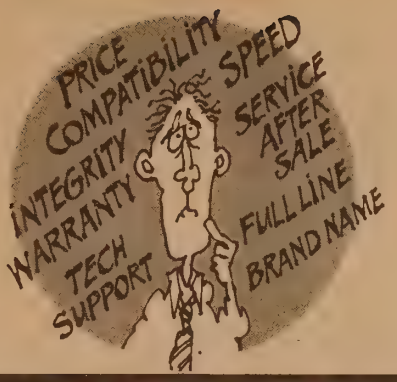

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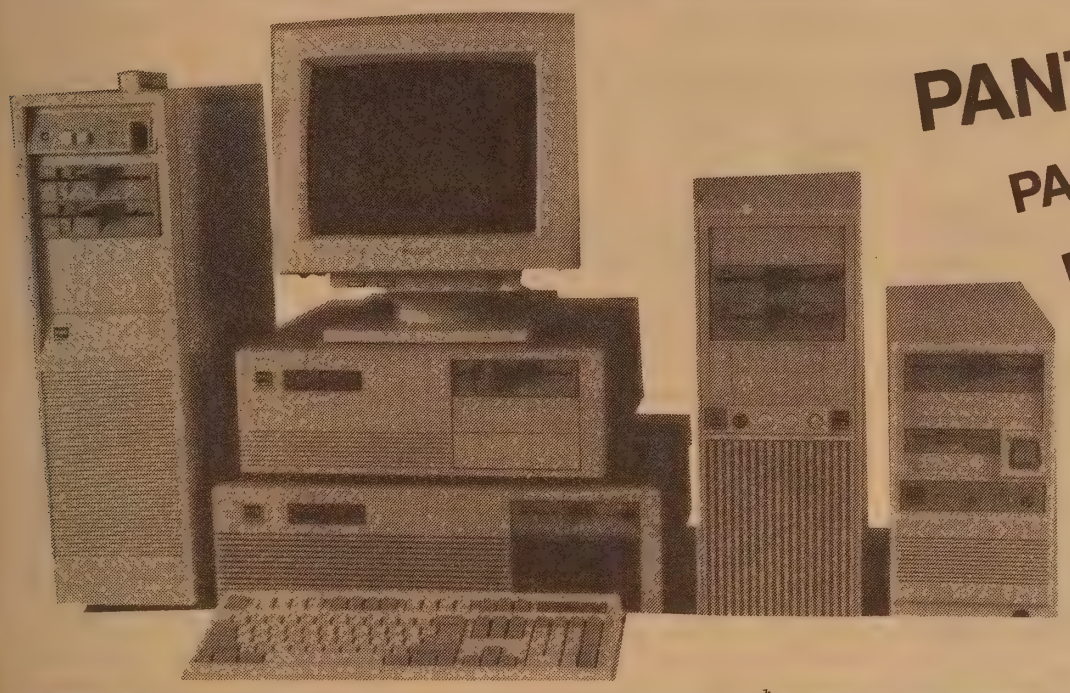

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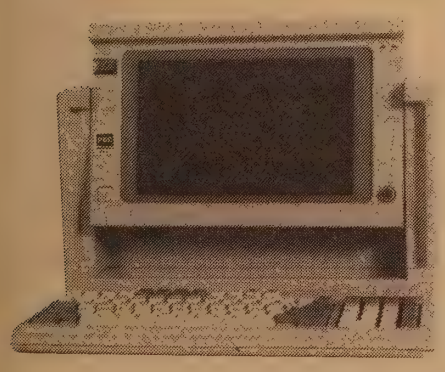

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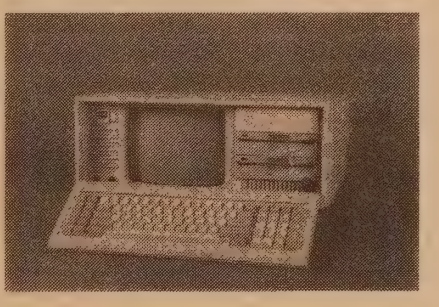

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•Modify the main DESQview menu to include hierarchical submenus.

•Allow batch files to be run from within a DESQview window, which open and close other windows and invoke DESQview processes. Sysops can automatically open and close separate mail processing windows at designated times without interrupting user access to their BBS systems.

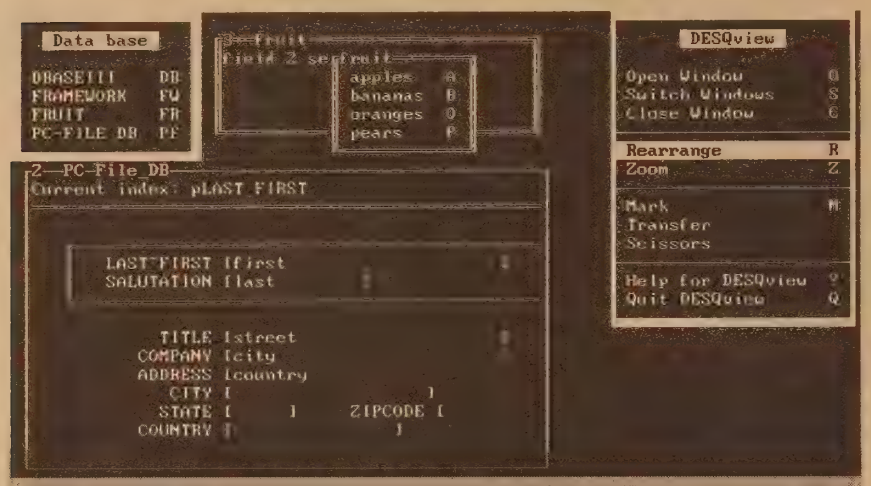
Other user-written utilities allow a window to send itself into the background, or automatically redirect screen display for stubborn programs to BIOS calls (allow them to run in small DV windows). Multitasking speed under DESQview can be increased by using watchdog utilities which monitor an idle program's demands on CPU time.

Some of these user add-ons make use of Quarterdeck's API, a programming language for the DESQview environment. Gregory Stewart's DVAPMENU is the one of the most innovative. His program lets you create nested submenus under DESQview's main "Open a Program" menu. If you have 30 or 40 applications which you run occasionally under DESQview, you can group them into categories like Word Processing, Graphics, Databases, etc., then launch individual programs from pop-up category menus.

David Thomas's Tame dramatically increases the speed of second and third programs running under DESQview by reclaiming processor time usually taken by an idle first program. Tame is designed to steal back time from CPU hogs like WordPerfect. Norton's Sysinfo benchmark jumps from 6.1 to 8.0 on my 12 MHz system when Tame is monitoring the first window in the background.

Some of the programs offered through DVNet BBS nodes are also available on Quarterdeck's own BBS. If you dial into the conferencing systems on SMARTnet and RBBSnet, you can also get up-to-the-minute feedback on word processing, desktop publishing, database software, programming and other topics.

Most of these bulletin board systems are free (though some solicit voluntary user subscriptions). Check the list at the end of this article for a node in your calling area.



DVAPMENU lets you create hierarchical submenus within DESQview's main menu.

Comparisons: DV 2.20-2.26

Quarterdeck is currently shipping the latest in a series of maintenance upgrades for DESQview 2.2. These updates are issued as engineering releases.

Some users will find little difference between the upcoming version and last year's upgrades. All of the 2.2 releases leave you the same amount of memory for running programs. Version 2.26 adds no new features, but will continue to improve stability and reliability of performance with off-the-shelf DOS applications.

V. 2.26 has about 20 more preinstalled program choices on the "Add a Program" menu. Engineering improvements include added work on high resolution video drivers, further work on mouse/video compatibility with Microsoft Word, and added compatibility with remote control terminal programs like PC-Anywhere.

A new setup option lets DESQview distinguish between keyboard shift states in different windows, supporting IBM 3270 and 5250 terminal emulation. The internal autodialer will now recognize up to four serial ports. Context sensitive help messages have been added to help the user fill in the setup boxes in "Change A Program."

For DESQview connoisseurs, here is a brief summary of changes in the upgrades issued last year:

•DV 2.2 provides about 30 K more memory for applications than DV 2.0. It introduces the ability to adjust foreground/background performance on the fly. The "Change a Program" menu allows more control over serial port status, CPU sharing, and screen virtualization with 80386 machines.

•DV 2.22 is the last version where the Memory Status window can be resized. It has some small problems with mouse/video coordination in some configurations. It supports a two-monitor Hercules-to-CGA/EGA switching system.

•DV 2.24 adds "Revive mouse" option to the menu. It has a noncritical bug with DOS's "Format" command. The graphics drivers are changed so that two-monitor support only works if you make the CGA or EGA your primary monitor.

•DV 2.25 fixes "Format" bug, and stabilizes performance with most off-the-shelf DOS applications.

•DV 2.26 has stronger compatibility with high resolution VGA video modes and better terminal support. More keys can be defined as DESQview system keys, and there are now ten settings to reconcile keyboard conflicts with other programs. Monochrome EGA/VGA graphics can now be "virtualized" in small windows on a 386. There are no new features on the main menu.

•The biggest change in the 2.26 package comes with the upgrade of the 80286 extended memory manager, QEXT.SYS., to conform to Microsoft's new standard (called XMS). The enhanced QEXT.SYS is also distributed separately with Quarterdeck's QRAM package.

XMS is a Microsoft technology which is almost certain to confuse people who've been struggling with the older issue of expanded vs. extended memory. The only visible result so far from Microsoft is a device driver called HIMEM.SYS. HIMEM.SYS lets other specially written programs access the first 64 K of extended memory as part of DOS. The XMS standard has been defined by Microsoft to do more tricks, but no applications have been written to take advantage of them yet. Quarterdeck's QEMM v.5 or new QEXT.SYS can now be freely substituted for Microsoft's HIMEM.SYS to allow DESQview, Windows 286/386 and Xerox Ventura Publisher to use the first 64 K taken from extended memory.

So Quarterdeck now allows you to gain an extra 64 K for DOS applications in three separate ways: by mapping the area immediately above 640 K from expanded memory, by mapping the extra RAM on an EGA/VGA card to this area or by allowing XMS-aware programs to use the first 64 K of extended memory. The first two options are mutually exclusive, but can be added to the third. Thus, programs which use Microsoft's XMS standard (DESQview, Windows 286/386, Ventura) may gain as much as 128 K. Programs not written for XMS can only gain DOS memory with one of the first two options.

Tweaking DESQview For Better Performance

Here are some tips for running common applications in DESQview. These tricks are gleaned from the SMARTnet conference, Quarterdeck's technical support team, and my own experience.

Most of these fine-tuning tips involve changing DESQview's startup specifications for the program. This is done by invoking "Change a Program" from the (DESQ) menu and entering information in the appropriate box. For new users, making these changes can be the most bewildering aspect of DESQview, but gaining familiarity with the control options pays off later with problem-free multitasking.

DV and Page Preview Using Hercules Graphics: WordPerfect, WordStar and Microsoft Word all allow the user to do graphic page previews. Consequently, these programs shift back and forth from "Text" to "Graphics" modes. DESQview with a Hercules card is unable to follow these shifts accurately. Once you've done a page preview, the screen may get scrambled when it shifts back to text mode.

Quarterdeck has a workaround called DVHERC.COM, which manually forces the Hercules card to return to text mode. Install DVHERC in the window with your word processor by using a short batch file as the program which opens the window.

Example for WordPerfect: Wp.Bat

DVHERC.COM
WP.EXE

When DVHERC is installed, you can restore the text screen at any time by pressing CTRL-ALT-1.

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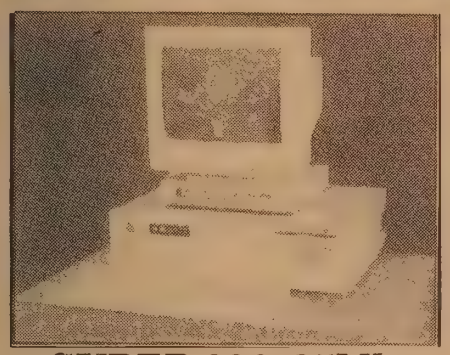

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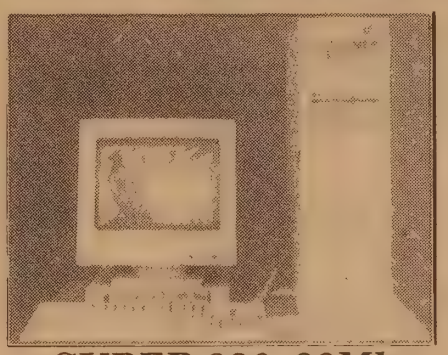

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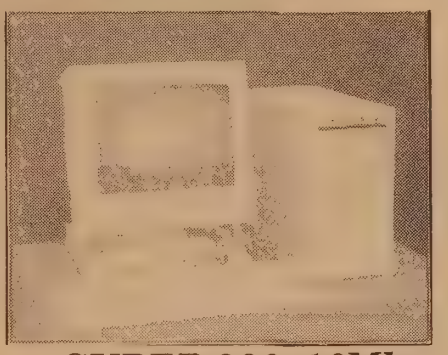

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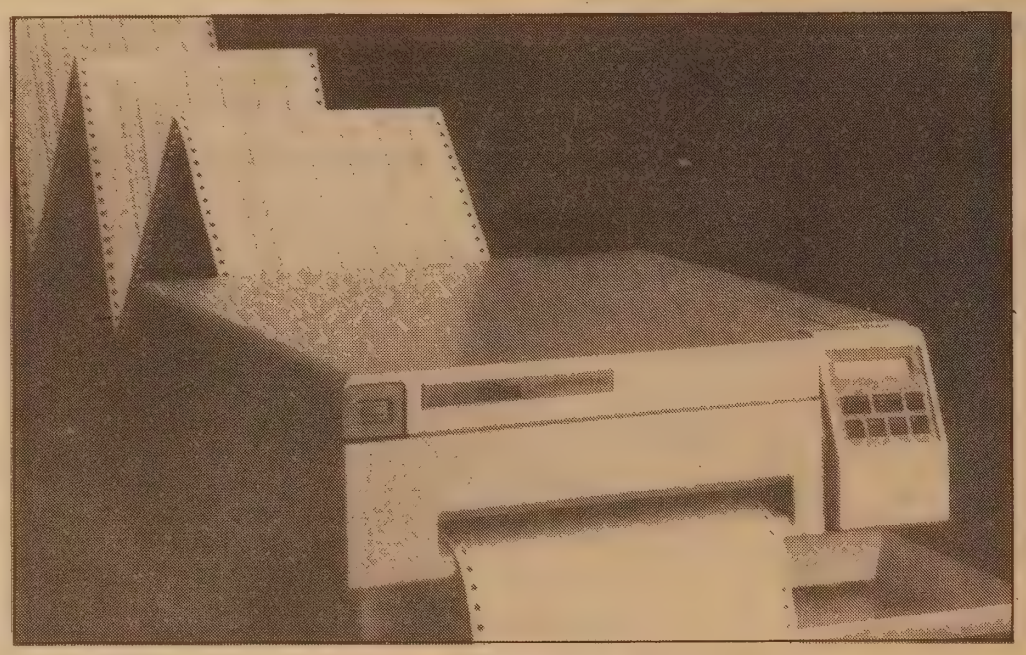


Output Tech Unveils Continuous-Form Desktop Laser Printers

The LaserMatrix 1000 is the first continuous form desktop laser printer, making it a quieter, faster, and higher resolution alternative to traditional line matrix printers. The 3 1/2" x 9 1/2" adjustable tractor feed allows for smooth feeding of various label and paper stocks. A high performance BP 100A ASCI controller chip maintains peak 1000 LMP speed in all applications, including labels, bar codes and graphics.

This printer has a special scaleable font which can print in any point size; no extra fonts are needed for large character printing. Also included are two HP compatible font card slots, which can be used simultaneously for access to HP's large font library.

The LaserMatrix 1000 is the result of an alliance between Output Technology Corp. and several component manufacturers, including Rastek Corp., BluePoint Technologies Inc., Bitstream., and Genoa Technology, Inc. ($7995) OTC, E. 9922 Montgomery Dr., Spokane, WA 99206. 1-800-468-8788.

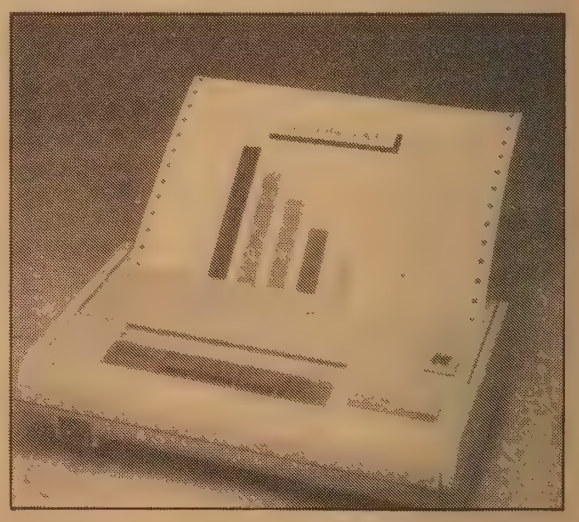
Okidata Presents The Laser Printer For Everyone

Okidata has introduced a new low-profile laser printer to meet the demands of a growing mass market. The Okilaser 400, measuring under six inches high, is a laser printer that fits as comfortably on an office desk as it does on a home work table. But size is only the beginning. This new printer, built around Okidata's proprietary LED engine technology, features fewer moving parts, and is compatible with a wide array of word processing and graphics software to allow you to create and crisply print reports, correspondence, memos, graphs and a wide variety of documents. The 17 built-in Bitmap fonts in four typefaces provide for well-defined print, plus a font card slot for the easy addition of fonts. The 512 K RAM Memory will easily handle most individual user document needs and is expandable to 2.5 Mb RAM for full graphic applications. Printing four pages per minute with 300 dpi, the Okilaser 400 runs a variety of standard paper stocks. Card stock, mailing labels and overhead transparencies are also easy to use.

The new printer has a one-year warranty and is supported by a nationwide network of Okidata service centers. ($1,395) Okidata Corporation, 532 Fellowship Rd., Mount Laurel, NJ 08054. (609)235-2600.

Go Printing: Kodak's Printer Companion For The Laptop

The Kodak Diconix 150 Plus printer is an ideal companion for a lap-top computer, preparing reports, presentations and memos wherever you may be traveling. The portable ink-jet printer works with both single-sheet feed paper stock and continuous-feed paper. You have your choice of high resolution graphics or text with 192 dpi, or printing in a draft mode of 180 characters per second. The "drop-on-demand" ink-jet type system means nothing strikes the paper but ink. The Diconix 150 Plus printer produces only 45 decibels—much less than the average noise level of most offices.



The battery-powered unit weighs 3.1 pounds, excluding batteries, and measures 2" high by 6 1/2" deep by 10.8" wide, making it roughly the size of a standard office dictionary. (Parallel port, $519; serial port, $529) Eastman Kodak Co., 343 State St., Rochester, NY 14650. 1-800-344-0006.

Brother Brings Out Pairs Of Printers

Brother has introduced four new high-speed dot matrix printers designed to handle business applications. These new printers include both a narrow and wide carriage 9-pin (M-1809/M-1909) with a printing speed of 360 cps for data processing, near letter-quality printing at 75 cps and a letter-quality mode at 50 cps. The two new narrow and wide carriage 24-pin printers (M–1824L/M–1924L) have draft speeds of 337 cps and letter-quality rates of 90 cps. High resolution graphics are attainable through the 360 x 360 dpi graphics capability of these 24-pin printers. A large selection of built-in fonts are also available. (M-1809/M-1909, $549/$699; M-1824L/M-1924L, $749/$949) Brother International Corp., 20 Goodyear, Irvine, CA 92718. 1-800-284-8640.

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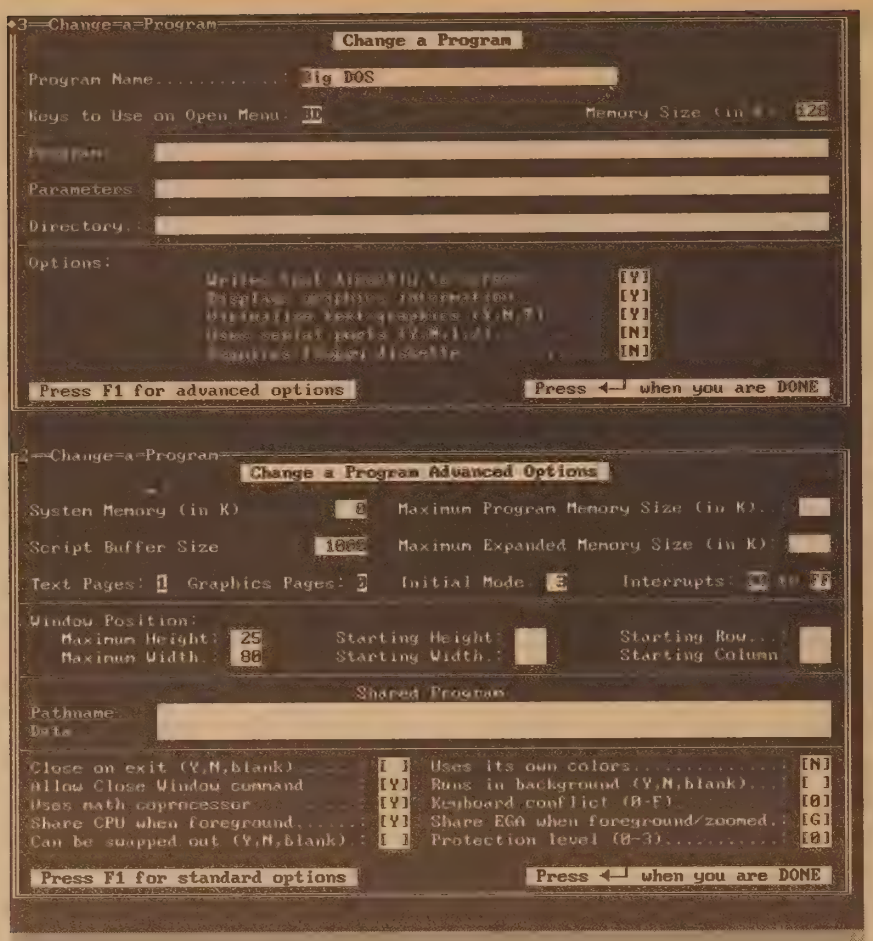
Change a Program
Program Name..... Big DOS
Keys to Use on Open Menu: ID
Memory Size (in K): 128
Parameters:
Directory:
Options:
Press F1 for advanced options
Press ↵ when you are DONE
Change a Program Advanced Options
System Memory (in K): 0
Maximum Program Memory Size (in K):
Script Buffer Size: 1000
Maximum Expanded Memory Size (in K):
Text Pages: 1 Graphics Pages: 2 Initial Mode: 3 Interrupts:
Window Position:
Maximum Height: 25
Maximum Width: 80
Starting Height:
Starting Width:
Starting Row:
Starting Column:
Shared Program
Pathname:
Data
Close on exit (Y,N,blank) [ ]
Allow Close Window command [Y]
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Keyboard conflict (0-F) [0]
Share EGA when foreground/zoomed [G]
Protection level (0-3) [0]
Press F1 for standard options
Press ↵ when you are DONE

The Change a Program menu allows a good deal of fine-tuning for better program performance.

DV and MS Windows: Windows 286 won't run under DESQview unless DOS can open at least ten files in conventional memory. Make sure the statement Files=10 is included in your Config.sys. File allocation above 10 can be placed in high memory with the LOADHI statement.

Use the new Quarterdeck memory management software (either QEMM, v.5 or the latest QEXT.SYS) in place of Microsoft's HIMEM.SYS for extended memory management.

DV and Xerox Ventura Publisher: Ventura Publisher 2.0 is a memory hog, normally requiring at least 550 K to run. Users of VGA and EGA graphics on 286 machines may have difficulty configuring a DESQview window of that size. With Quarterdeck's new extended memory management, Ventura Publisher can run outside of DESQview in as little as 490 K of conventional memory. Inside of DESQview, Ventura Publisher will still need a 550 K window.

Quarterdeck's new QRAM may allow some extra memory to be gained with use of the Optimize and Loadhi commands. The All Chargecard (See *MicroTimes* #62) will also typically increase maximum window size by 64 K.

Another workaround is to install Ventura Publisher for Hercules monochrome graphics, if your monitor and card support it. Quarterdeck's new VIDRAM utility will automatically add 64K of memory to DOS from EGA/VGA cards used in Hercules mode.

If you're within 5-10 K of enough memory, you can also decrease the amount of system memory allotted to DESQview.

If you don't use Ventura Professional Extension, set "Maximum Expanded Memory" under "Change a Program" to 92 K. If your mouse stops working unexpectedly, it may help to change the mouse switch in Ventura's startup batch file from /M=03 to /M=02.

DV and WordPerfect: WordPerfect 4.2 will run in as little as 200 K, allowing even users with no expanded memory to open two copies simultaneously. When WordPerfect is short on memory, it will swap documents out to disk. With 4.2 and a fast hard disk, this slows performance down only slightly.

Screen writing can be speeded up by installing Quarterdeck's NOFF.SHP shared memory utility under advanced setup in "Change a Program."

WordPerfect 5.0 and 5.1 do slower disk writes. Increase the amount of memory available to these programs to avoid disk writes and speed things up.

The current version of WP 5.1 is incompatible with some versions of expanded memory. Use of expanded memory by WP 5.1 can be disabled in "Change a Program" under "Advanced Setup" by entering 0 for "Maximum Expanded Memory Size."

To avoid losing keystrokes in WP 5.1 while saving a document, set "Keyboard Conflict" under "Change a Program" to 3.

DV and WordStar 5.5: To prevent losing keystrokes and avoid other keyboard conflicts with WordStar 5.5, run WordStar's WSCHANGE program outside of DESQview and type <E> <=> to get to the patcher. Type in the label KSPEED and fill in the first eight bytes with "FF." This procedure has been reported to solve keyboard problems.

DV and High Speed Communications: The general tip is to load comm programs in the first DESQview window.

Quarterdeck's Manifest includes a benchmark which does a timing on the real alternate map set of your expanded memory card/motherboard. The manual says that a score of 400 or less on this test generally indicates that a 9600 baud modem can accurately exchange data in the background. If your EMS software can increase the number of alternate map registers, modem performance is improved.

Many DESQview users have also reported overcoming telecommunications problems by changing the UART chip in their serial cards. Replacing the 8450 or 16450 UART chip with a special NS16550 chip provides a hardware buffer for the serial port which improves high speed telecomm performance.

Problems with VGA Cards: Some VGA cards lie about the amount of high RAM address space they control. If your system locks up unexpectedly, try excluding the range C000-C7ff or C000-Caff from control by QEMM or DESQview.

DV and Lotus products: Lotus 1-2-3, v.3 requires that 384 K extended memory be reserved for it in order to run under DESQview. 1-2-3 also tries to load its graphics driver on startup. If you've disabled the graphics modes of an EGA/VGA card to gain extra memory, this creates a conflict.

You can either restore the EGA/VGA modes on your card, or use Lotus's advanced setup outside of DESQview to disable the internal graphics features.

To use Lotus Freelance 3.0 with DESQview v.2.25 and below, the complete path information to the program must be inserted into DV's program information file. Users have reported that Freelance can also be launched from within a window running Lotus's Magellan with no difficulty. ■

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RESOURCES

DESQview, v. 2.26: Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405; 213/392-9701. $129.95; upgrade for users of v. 2.25 is $24.95. (QEMM 386, v.5 $99.95, QEMM 50/60 $79.95, QRAM $79.95. These three packages are bundled with MANIFEST, v.1—see *MicroTimes* #65 for upgrade information)

Quarterdeck BBS (for registered users): 213/396-3904

DVAPMENU, from Gregory Stewart, available on QOS BBS and through DVNet.

TAME 210, from David G. Thomas, P.O. Box 956338, Duluth, GA 30136 (and from QOS BBS, DVNet)

Local nodes for DESQview Conference on SMARTnet:
Charisma BBS, 415/349-6576
Network 2000, 415/474-4523
The Pixel Penguin (via RELAYnet), 415/482-3402
The PC Gfx Exchange, 415/337-5416
The Higher Powered BBS, 408/737-9447
Mog-Ur's EMS, 818/366-1238
DPS, 213/459-6053
Little Angels, 213/387-5901
West Los Angeles BBS, 213/838-9229
AIM On-Line, 714/870-9624

Local nodes for DESQview Conference on FIDO/RBBSnet:
PCUG BBS, 415/621-2609
The Transporter, 415/441-0616
SeaHunt BBS, 415/344-4348
G.A.D.M TBBS, 415/581-3019
Third World, 818/700-9591
Comland BBS, 714/882-7181

West Coast DVNet Nodes (with DESQview related file areas):
65'North, Fairbanks, AK, 1:17/38, (907)452-1460
Opus 386, Davis, CA, 1:203/910, (916)753-6321
SeaHunt BBS, San Francisco, CA, (415)344-4348
Carl's Corner, San Jose, CA, 1:10/1, (408)248-0198
Bink of an Aye, Portland, OR, 1:105/42, (503)297-9043
P C Support, Portland, OR, 1:105/66, (503)297-9078
Atarian BBS, Portland, OR, 1:105/10, (503)245-9730
Busker's BoneYard, Portland, OR, 1:105/14, (503)771-4773
Puget Sound Gtwy., Puyallup, WA, 1:138/3, (206)848-9232

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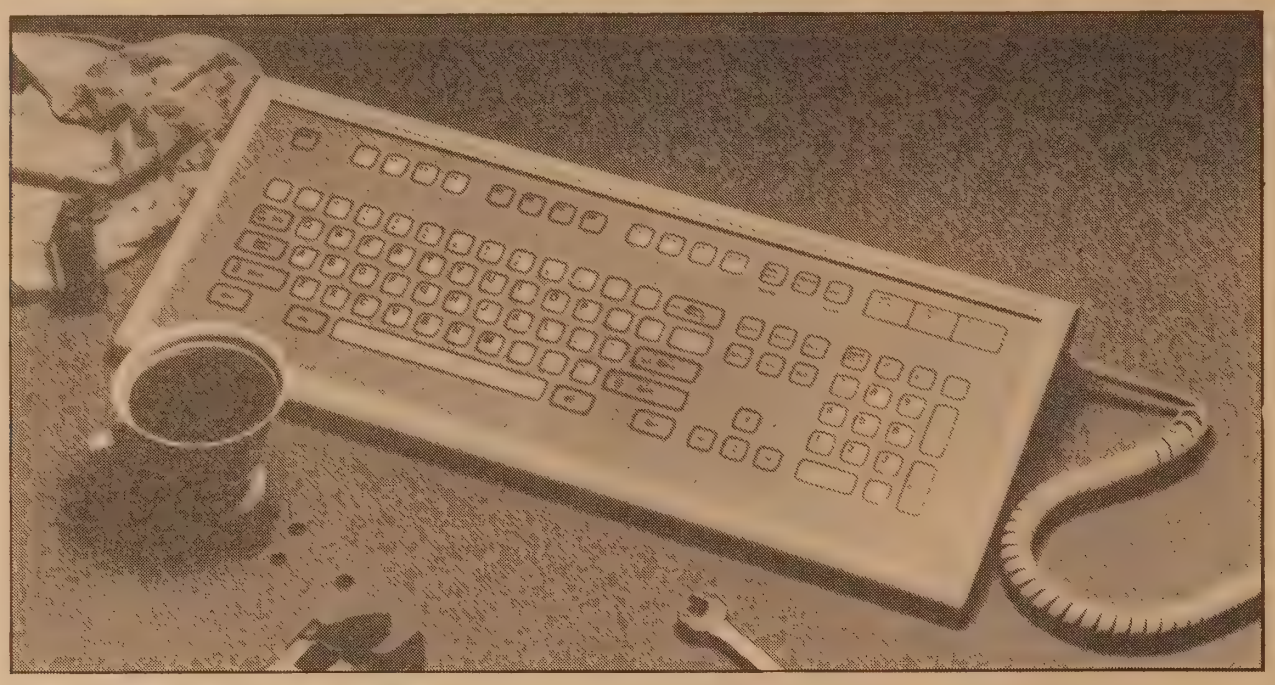


Honeywell's Child-proof Keyboard

Honeywell has introduced a new 101-key, touch panel keyboard, the 101TC, for use in manufacturing, laboratory, medical, and other harsh environments, like the home office. The keyboard is sealed to protect it against dust, grime, moisture and liquids. The 101TC is plug-compatible with XT, AT and PS/2 compatible computers. It includes status LEDs for Caps Lock, Num Lock and Scroll Lock. A metal snap dome disc gives the operator tactile feedback. Audible feedback is also available.

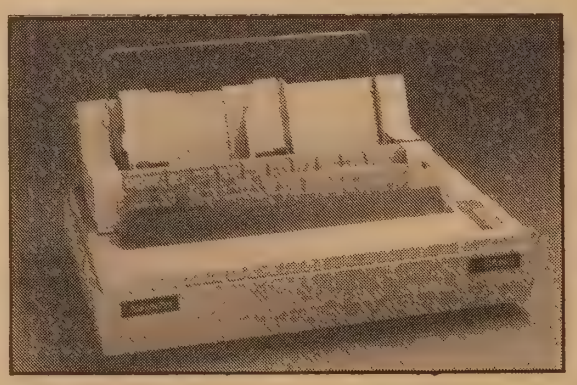
The touch panel itself is completely flat, with embossing to facilitate positive finger positioning. Subsurface printing techniques increase durability. Custom graphics are also available, providing for any format, type style, graphic symbol key configuration or logo to be incorporated.

The 101TC keyboard carries a two-year warranty. ($282.50) Honeywell Inc., Keyboard Division, 4171 N. Mesa, Building D, El Paso, TX 79902. (915)543-5503.

Professional Mac Keyboard From Key Tronic

Key Tronic Corporation, a leading manufacture of computer keyboards and other input devices, has a new Professional Series keyboard compatible for use with Macintosh SE, SE/30, II, IIx and IIcx. The 105-key layout MacPro includes a large L-shaped **Return** key, a large **Delete** key, and **Ctrl**, **Option** and **Command** keys on both sides of the space bar. The numeric key pad layout is similar to Apple's desk accessory calculator, and features a **Power On** key with LED status indicator.

The MacPro uses Key Tronic's capacitance key switch technology, giving it a reliability rating of 100-million key strokes. It comes with a three-year limited warranty and unlimited toll-free technical support. Included with the MacPro is the Tempo II keyboard macro software from Affinity Microsystems, Ltd. Tempo II allows users to record text strings, button clicks, file operations, and keystrokes and mouse strokes for playback as a single command. ($197) Key Tronic Corporation, PO 14687, Spokane, WA 99214-0687. (509)928-8000.



Plotting Without A Pen

The RasterPro 720 color graphics penless plotter, by Da Vinci Graphics, provides an alternative to conventional plotters. Da Vinci's technology converts vector-based plotter instructions to an optimized raster printing format through a series of unique image processing and rasterization schemes. Using no pens, it cannot skip, clog or smear during the plotting process, and it saves on the cost of pens and special plotter paper normally required. The RasterPro 720 provides plots up to ten times faster than pen plotters producing high resolution output, depending on plot complexity. Offering four selectable line widths—0.2 mm to 1.3—a palette of 15 colors, and an addressable graphics resolution of 720 dots per inch (dpi), the RasterPro 720 with a plotter's margin of error of 0.0 mm results in perfect color registration. Also offered is a high draft speed mode (180 or 360 dpi) in color or monochrome that produces check plots in a fraction of the time required to produce presentation-quality output. In addition, the user can usually replot in high resolution mode (720 dpi) with a single command and no central processing unit involvement.

Da Vinci has targeted computer-aided design environments that require precise hardcopy design specifications. Specific CAD markets include mechanical engineering, electrical engineering, and architectural and engineering construction. Other markets include mapping and engineering analysis. The RasterPro 720 is distributed through authorized Da Vinci Graphics distributors who in turn market the product to VARs and resellers.

Da Vinci has also entered into a service agreement with Fujitsu Customer Service of America, Inc. (FCS) to service the penless plotter. The basic warranty covers four months on-site service or one year of return-to-depot service at no charge to the customer. As part of its normal return-to-depot service procedure, FCS will completely refurbish the RasterPro 720 should it fail for any reason under basic or extended warranty coverage. ($3495) Da Vinci Graphics, Inc. 870 Hermosa Drive, Sunnyvale, CA 94086. (408)737-8800, Fax (408)737-8910.

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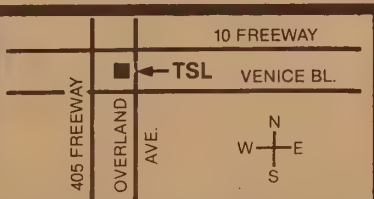

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ATARI ST

BY DAVID HAWKINS

Drakkhen!

A Great Game From France—Better Than Dungeon Master?

I picked up a very interesting game last week—Drakkhen, from Infogrames (yes, there is a "r" in there). I've looked through the box and didn't find any US address or phone number. Evidently they're French—the manual's written in English, French, German and Italian. Some claim it's better than Dungeon Master. I am not ready to make that claim, but it is a very good game.

Drakkhen has great graphics and a good user interface. Some of the visual effects are probably as close to arcade quality as you're going to get on an Atari ST. A wide variety of visual effects are used—it supports multiple points of view. When the group is outside, you can turn in minute degrees, not just 90 degrees. The user interface is nice in that you can use the mouse, the keyboard, or a joystick.

A team of four humans is trying to save the human race from being hunted out of existence by the dragons and their descendants. The manual's author seems to think that most game players would be sympathetic to the humans.

(By the way, if you play the Amiga version you can hook it up to a sound system and hear the special audio effects in stereo.)

There are a few drawbacks. The first is the most important—the manual is barely adequate for such a complex game. I thought getting started was unnecessarily frustrating, but I enjoyed the game once I got going.

The World Of Drakkhen

The manual comes in two separate booklets; the first contains the mythos behind the games. A team of four humans is trying to save the human race from being hunted out of existence by the dragons and their descendants. The manual's author seems to think that most game players would be sympathetic to the humans. At the end of this booklet is a description of the magical spells that can be used in the game. Unfortunately it's not clear what each spell is or how to use it.

The second booklet takes up the description of how to actually play the game. It has some very terse descriptions of how to use your team and how to get started.

Getting Started

First, format a disk and label it for Drakkhen use only. I accidently copied another file to my Drakkhen disk and it trashed it. Drakkhen seems to use its own formatting and filenames.

Then you boot with the second disk and create your four characters. This is a lot like other fantasy role-playing games. The roles are fighter/amazon, scout, magician and priest/priestess. You roll an electronic die and assign these attributes to the character: strength, dexterity, constitution, intelligence and education. These are saved to your newly created Drakkhen disk. Then you reboot the system with the first Drakkhen disk.

Dumb Humans

If you read the less-than-adequate manual carefully, you'll see that each character is carrying certain items. These are not activated until you examine the character and click on each item. I'm not sure on the logic of this. You have a team of highly trained warriors and when confronted with a monster they start beating on it with their fists instead of using their swords? Things look bleak for the human race at this point.

Anyway, the first thing to do when you actually start playing the game is to select each character and activate her/his armor and weapon. Your odds of surviving the first five minutes will increase greatly. As soon as you've equipped your party, save the game. You might be returning to this point fairly often.

You have a team of highly trained warriors, and when confronted with a monster they start beating on it with their fists instead of using their swords? Things look bleak for the human race at this point.

My next gripe was the lack of a specified way to pause the game. It turns out that you can pause the game by examining one of your characters.

Onward?

Well, in roughly 20 hours of play, that's where I am. Just started. My team just doesn't last very long. If I still taught high school I could probably take the Atari to school, turn some kids loose on it and watch them solve it in about 30 minutes.

But I'll keep plugging away. Why? First, it is an interesting game. It's worth a certain amount of frustration. By now I've probably forgotten how frustrating Dungeon Master was over two years ago. And this game really might be better than Dungeon Master.

Oh, and when I get real frustrated at Drakkhen, I play a game of Empire to show that I really can beat the computer. It's nice to have Empire to fall back on.

Portfolio

If you're in a store checking out Drakkhen, take a look at Atari's Portfolio. It's an interesting little computer. I hope to get a review in of it soon. ■

Copyright © 1990 by David Hawkins. All rights reserved. *David Hawkins is the host of the Atari conference on The WELL (415/332-6106); send email to dhawk. He has one of the first Atari ST 1040s sold in San Francisco. Both monitors, an Okimate 20 color printer, and disks are all over the room.*

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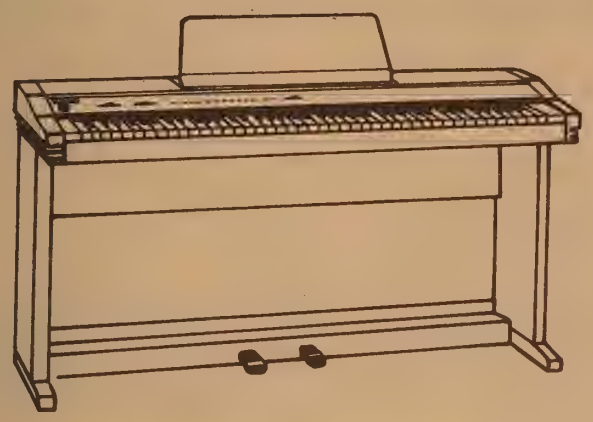

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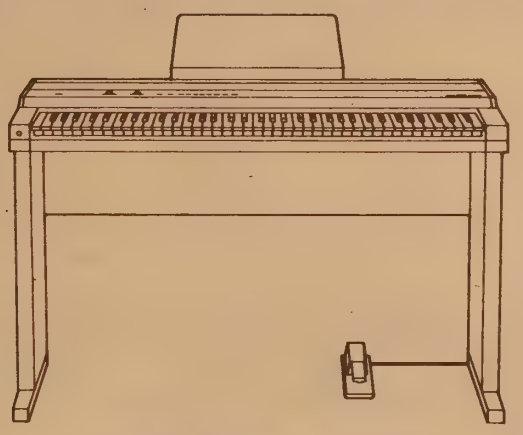

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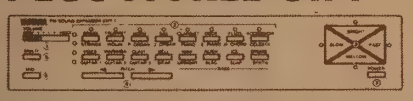

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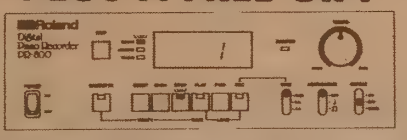

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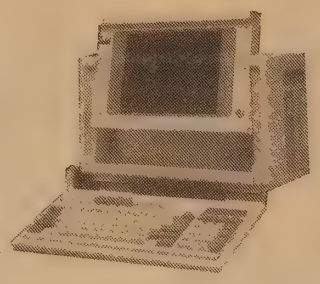

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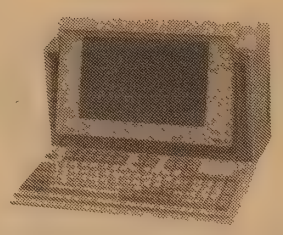

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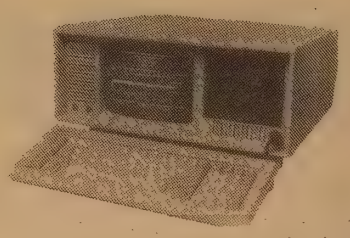

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BY MATTHEW LEEDS

New Life For Old Amigas

In 1985 the Amiga 1000 set a new standard for microcomputers. It offered multi-tasking, 4,096 colors, stereo sound, and the choice of two different interfaces: command line or graphical. Five years later, the Amiga 1000 is beginning to show its age. The A500 and A2000 have replaced it in the sales room, peripheral manufacturers have stopped creating new products for it, and Commodore has just completed a trade-in offer designed to let early adopters move up.

Up to now, A1000 owners have not been missing much by keeping their machines. Most Amigas are expanded via additional memory and a hard disk, and those are still available for the A1000. Accelerator cards adding a 68020 or 68030 CPU are also available. About the only thing you can't do for an A1000 is add a FlickerFixer, and you can't put one in an A500 either.

There is however, change in the wind. Rumors of a new version of the operating system and new hardware have left some A1000 owners feeling concerned. Will they still have an upgrade path? A new version of the custom chip set has begun to ship, with 1 Mb Agnus chips already available, and a new Denise coming soon. The A1000 does not support this new chip set.

A new company has taken up the challenge to keep the A1000 compatible with virtually all of the new features coming for Amigas. Expert Systems has announced the availability of the A1000 Rejuvenator. This device, designed by Gregory B. Tibbs, upgrades the memory and custom graphic chips of the A1000 computer to the levels used by the latest machines from Commodore. It prevents obsolescence and retains an owner's investment in A1000 peripherals.

The Rejuvenator is available in partially and fully populated configurations. The fully populated version will list for $499.95. The partially populated version is less than the 1 Mb Agnus and DRAM, and lists for $349.95. Both versions are fully assembled and tested before shipment.

A fully populated Rejuvenator will contain 1 Mb of new RAM that will be used as graphic memory. The old 512 K of graphics memory on the motherboard is reusable either as true fast RAM, or as 256 K fast RAM and 256 K of write protectable Kickstart memory.

Additional features include a battery-backed real-time clock, and an A2000-style video slot. The Rejuvenator also allows A500 Kickstart ROMs (256 K or 512 K) or Kickstart Disks to be used.

The installation generally requires no modifications to the motherboard. It simply replaces the existing Kickstart daughterboard. Many A1000 peripherals have been tested and found compatible. This list includes SideCar, Insider, Spirit RAM board, Palomax, CMI accelerator, LUCAS, ToolBox, and ECS Denise.

Copyright ©1990. All rights reserved. *Matthew Leeds has been involved in the high tech field since he blew up his bedroom playing with a children's chemistry kit. He has been using Commodore computers since 1982 and has a strong interest in photography, video, graphics, and related fields.*

Other News

In other news, several Amiga software companies have gone out of business, and a few others are tottering on the edge. Most of the products marketed by Aegis and Par are now being handled by Oxxi. In addition, the programmers of Microillusions' Photon Paint are now working on a new product for Oxxi.

Syndesis has shipped the latest version of InterChange, V1.5. The new version includes support for the fast binary format used by VideoScape 3D V2.0 and Modeler 3D, the Metal and Glass2 textures in Sculpt 4D, script files for Sculpt 3D and 4D, and PAGErender 3D from Mindware.

Commodore has special offers running through the end of May for the professional music and video markets. The music bundle adds a MIDI interface and three software programs to an A2000HD with a 1084 color monitor. The programs are Keyboard-Controlled Sequencer V3.0, Copyist Apprentice, and a library software package, all from Dr. T, a leading music software developer. The video bundle adds an A2058 RAM expansion card with 2 Mb to the hardware, and includes TV*Text Professional and Deluxe Paint III. An advanced version of the video bundle includes an A2500/30 with 4 Mb of 32-bit memory, and Deluxe Paint III, Pro Video Gold, and Sculpt-Animate 4D.

Scene Generator

I get sent quite a variety of software to review. Some of it is good, some of it is bad, and some of it makes me wonder what the developer was thinking of. Occasionally I get to see something new and creative. Such was the case when I opened a package from Natural Graphics.

They sent the latest version of Scene Generator. This program creates random fractal landscapes that resemble natural landscapes. It produces 32 color overscanned scenes that can be used in illustrations, as backgrounds for animations, or just as pretty pictures.

The program is very well designed, and remarkably easy to use. All of the options are menu-selectable. You control the amount of detail the program generates, the colors used to paint the scene, the inclusion of snow or clouds, the land height, the direction of the lighting, the inclusion of water, its height and whether there are beaches.

Rumors of a new version of the operating system and new hardware have left some A1000 owners feeling concerned. Will they still have an upgrade path?

Two different overscan modes are supported. One is the same as the overscan used by Deluxe Paint III; the other is a more severe video overscan. You can shift the screen vertically by pressing the up and down cursor keys to compensate for monitor differences, a nice touch. You can save the generated scenes as IFF images, and you can also save just the settings used to generate them. Scene Generator also has a quick "preview" mode that displays a rough draft of the scene in about ten seconds. The final rendering time varies, but can take a few minutes, depending on the settings you've selected.

Shareware Of The Month

Shareware program of the month is Clean V1.01 by Chris Everett. It defragments memory on the Amiga by requesting a very large amount of memory (16 Mb). In addition, it closes the Workbench screen before it allocates memory. It attempts to allocate both chip and fast memory; this flushes all unused libraries and can sometimes give you more contiguous memory. ■

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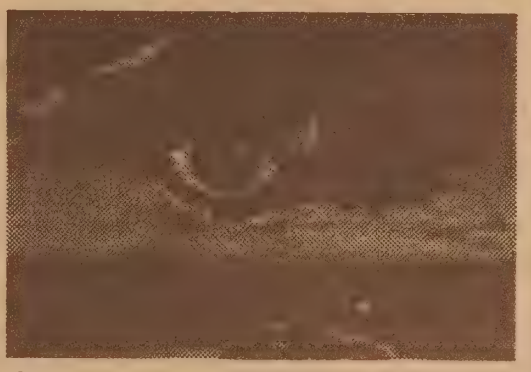

Actual image created on the Amiga

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BY BENNETT FALK

UNIX Is Not XENIX

A Look At SCO's First "UNIX"

The original UNIX was supposed to be a generally useful, portable, multiuser, multitasking operating system: a piece of software, nothing more and certainly nothing less.

But things turned out differently. UNIX is not just software, and indeed, more often than not UNIX is not "just UNIX," but something that comes with its own unique history and personality.

The Name Game

Inadvertently, AT&T, whose product UNIX is, helped to create this situation by simply reserving the trademark "UNIX" for itself while licensing the software to other companies who then (with varying degrees of cleverness) thought up names for their UNIX products. Soon the world was full of things like Venix, XENIX, Ultrix, Dynix, A/UX, and AIX. Other products that were "UNIX-like" without being licensed by AT&T cashed in on this peculiar nomenclature with UNIX-like names ("minix") or with recursive acronyms like GNU (GNU is Not UNIX) and XINU (XINU Is Not UNIX).

After more than a decade of this silliness, AT&T finally agreed to let its licensees use the name "UNIX" for their products. One of the first of these new "UNIXes" to reach the market is UNIX System V/386 from the Santa Cruz Operation, and no one was quite sure what to expect.

SCO is hardly a newcomer to UNIX software. The company built a very fine reputation developing and marketing XENIX (a UNIX implementation originated by Microsoft) for PC compatible hardware. SCO UNIX could hardly be either a carbon copy of AT&T's UNIX for 386 hardware or a renamed version of XENIX, but what other options are there?

A Short History

There are three different kinds of UNIX at large in the world, all sprung from a common ancestor, AT&T's Version 6. Version 6 was not licensed for commercial distribution, but it did become the foundation for the development work at Berkeley and it was the predecessor of Version 7, which was the first commercially viable UNIX release.

From Version 7, AT&T went on to develop UNIX System III and UNIX System (now System V, Release 4). Along the way, AT&T also became a manufacturer of computer hardware, and this hardware became the platform on which UNIX development was done.

Starting from Version 6, the University of California at Berkeley became a center for UNIX development and produced the version of UNIX known as the Berkeley Software Distribution (now BSD 4.3). Berkeley releases are numbered 4-point-something, with 4.2 and 4.3 going on to enjoy commercial success chiefly on DEC VAX and Motorola-based hardware.

Microsoft and the Santa Cruz Operation have jointly developed XENIX (most recently XENIX 2.3) for smaller microcomputers. The original XENIX was based on Version 7, and after a brief flirtation with the Lisa (Apple's predecessor to the Macintosh), XENIX became an implementation of UNIX for microcomputers based on Intel processors. Subsequent versions of XENIX incorporated some of the features of AT&T's UNIX products.

AT&T's UNIX has a reputation for being, well, awkward. The default shell for System V is the Bourne shell which offers very few opportunities for the user to cut down on the number of keystrokes needed to enter commands. Some of System V's utilities are downright rude: the 'ls' command lists file names in a single column format that is difficult to read and very likely to scroll off the screen. Some of the system's features (such as 'ulimit' which

SCO UNIX is an authentic System V, with many niceties for the Intel environment built in. Microsoft and SCO have collaborated to make the SCO UNIX development system particularly rich in features.

TABLE 1: DISK I/O TESTS

sco xenix	sco unix
Executing dwrite	
0.33	0.9
0	0
0.25	0.32
Executing dread	
0.65	1.06
0	0
0.23	0.33
Executing pipes	
1.23	1.97
0	0
0.53	0.77

TABLE 2: CPU ACTIVITY

sco xenix	sco unix
Executing sieve (100 iterations 1899 primes.)	
9.05	9.28
8.9	9.1
0.04	0.06
Executing loop	
1.8	2.24
1.7	1.7
0.03	0.08
System call	
2.45	4.04
0.25	0.39
2.13	3.32
Function call	
0.34	0.59
0.2	0.2
0	0.06
Assignment	
0.13	0.39
0	0
0.01	0.03
Function call overhead	
0.21	0.20

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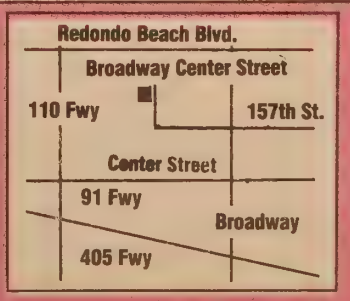

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Routine system administration chores under SCO UNIX are eased by the "sysadmsh" utility that provides a screen-oriented, menu-driven interface to most of the administrator's functions. SCO UNIX has come a long way from the old style of UNIX administration.

enables the system administrator to set maximum file size) are more annoying than they are beneficial. Above all, System V just seems slow.

Berkeley UNIX is often regarded as more flamboyant, more user-friendly, and more esoteric than other versions of UNIX. Many of the features essential to workstation operation were first developed in Berkeley UNIX: virtual memory (the ability to run processes larger than physical memory), network connections, full screen editing, job control, and a more convenient shell. Of course, these features require more sophisticated (and more expensive) hardware.

XENIX was created for relatively small, relatively inexpensive computers. Because it runs very efficiently and is easy to use and to administer, XENIX enjoys tremendous popularity among small businesses and hobbyists, but the popularity of XENIX with that audience has probably kept it from being taken seriously by others.

The New UNIX

Comparing SCO UNIX with the other varieties of UNIX is a tricky business. It is not as leaden as AT&T's System V; it does not have either the extravagance of Berkeley UNIX or the compact efficiency of XENIX.

It is certainly bigger and slower than the current release of XENIX. The system kernel of SCO UNIX is just over 500 K in size. A fully configured XENIX kernel is typically around 300 K. The kernel on a Sun 3/80 workstation (running Berkeley UNIX) will be about 700 K.

Like XENIX, SCO UNIX can run in as little as 2 Mb of RAM, but more memory is recommended. A complete installation of the basic SCO UNIX operating system and all the development tools could easily take 60 Mb of disk space, compared with 40 Mb for the comparable XENIX system and 60 to 80 Mb for the comparable Sun operating system installation.

SCO UNIX is an authentic System V, with many niceties for the Intel environment built in. Microsoft and SCO have collaborated to make the SCO UNIX development system particularly rich in fea-

TABLE 3: MULTI-USER TESTS

	sco xenix	sco unix
Shell 1		
	2.47	4.21
	0.08	0.11
	0.6	0.91
Shell 2		
	2.18	4.56
	0.18	0.25
	1.2	1.48
Shell 3		
	3.45	10.07
	0.18	0.39
	1.86	2.2
Shell 4		
	3.86	12.75
	0.31	0.49
	2.32	2.93
Shell 5		
	4.77	19.88
	0.38	0.64
	2.91	3.77
Shell 6		
	5.71	23.75
	0.48	0.84
	3.53	4.46

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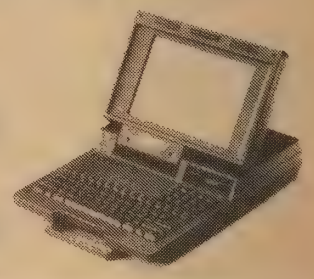

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tures. Both the Microsoft and AT&T C compilers are provided. Microsoft's Code View debugger and MASM Macro Assembler are part of the development system, as are libraries for cross-development of software for XENIX, DOS and OS/2.

The most striking new feature of SCO UNIX is the ability to run UNIX as a "trusted" system in accordance with guidelines published by the Department of Defense. SCO UNIX has facilities to run at a C2 security level. Computer system security is a good thing to think about, and the SCO documentation on maintaining security is very good. Ideologically, however, it is no easy thing to reconcile the concept of a trusted system (and the limitations on user activity that that implies) with the openness, willingness to explore, and commitment to self-regulation that have traditionally characterized the UNIX user community.

Routine system administration chores under SCO UNIX are eased by the "sysadmsh" utility that provides a screen-oriented, menu-driven interface to most of the administrator's functions. SCO UNIX has come a long way from the old style of UNIX administration. The documentation contains dire warnings that under no circumstances should the password file be edited manually.

There are other new wrinkles to SCO UNIX as well. Mail under SCO UNIX is handled by the Multi-channel Memorandum Distribution Facility (MMDF), which is relatively simple to use, but takes some care to configure. (MMDF configuration is not yet part of the sysadmsh menu system.)

The installation procedure for SCO UNIX is very similar to that used for XENIX, and worked flawlessly the first time.

The increased size and complexity of SCO UNIX does not bode well for its performance. Tables 1-4 show the results of running a modified version of the UNIX benchmarks first published by David Hinnant in *Byte* in 1983 under both XENIX and UNIX. The same hardware was used for both tests: a 16 MHz Wyse 386 PC with 2 Mb of RAM, an 80287 math co-processor, and a 60 Mb hard disk. This is essentially a minimum configuration for SCO UNIX.

On a purely computational test, like the sieve prime number generator, the two operating systems perform about equally well. In virtually every other category of test the XENIX system outperformed SCO UNIX. UNIX's performance on the multiuser tests was particularly disappointing.

SCO UNIX is a new venture for the Santa Cruz Operation. This System V product is the foundation for a number of other software offerings from SCO, most notably the Open Desktop workstation software. SCO UNIX is rich in features but not particularly impressive in performance.

The larger issue of the personality of SCO UNIX is not entirely resolved, but the combination of an attractive development package and security features promises that SCO UNIX will find an identity all its own. ■

TABLE 4: COMPILER TESTS

sco xenix	sco unix	sco xenix	sco unix
Compiling dwrite.c		**Compiling loop.c**	
4.76	14.55	2.83	11.73
1.11	1.25	0.65	0.61
1.39	2.34	1.07	2.02
Compiling dread.c		**Compiling pipes.c**	
3.4	12.64	3.1	11.74
1.11	1.28	0.94	0.97
1.12	2.17	1.08	2.14
Compiling fcalle.c		**Compiling scall.c**	
2.81	11.4	2.73	10.97
0.7	0.57	0.62	0.48
0.99	1.94	1.02	1.92
Compiling fcalla.c		**Compiling sieve.c**	
2.62	10.86	3.01	11.53
0.57	0.45	1.07	1.05
1.03	1.93	1.04	2.09

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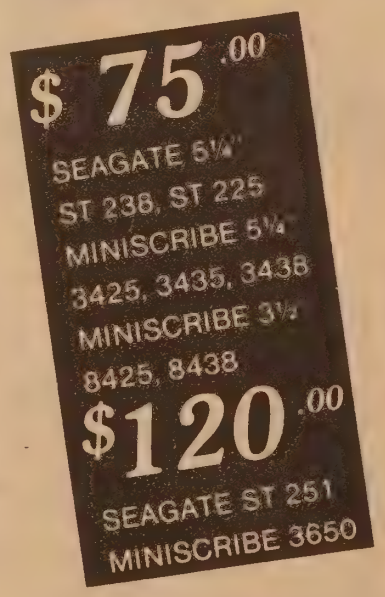

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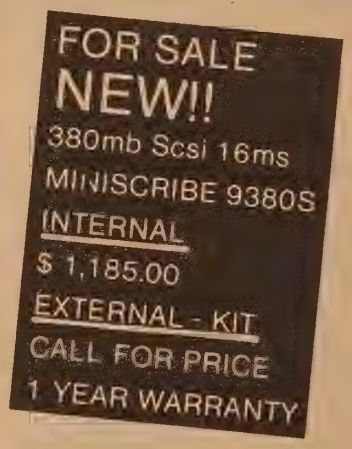

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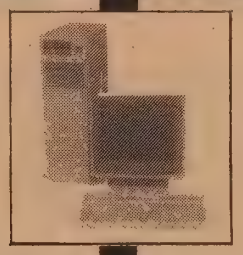

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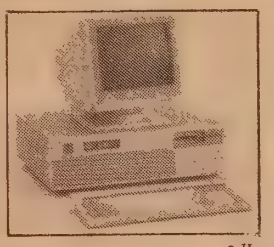

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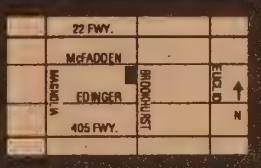

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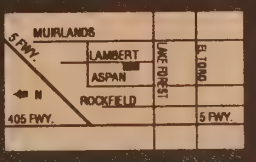

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San Gabriel Valley Mac Users Group. Meetings: 1st Thursday, 7:30 pm., 285 E. Walnut, Pasadena Central Library Auditorium. Call: Char Rice, (213)684-4266. [Exp. #73]

Whittier Area Mac Users Group. Meetings: 2nd Saturday, 10:00 am, 11818 S. La Mirada Blvd., Granada Heights, Friends Church, rm C-21. Call: Char Rice, (213)947-2447. [Exp. #73]

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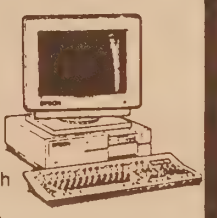

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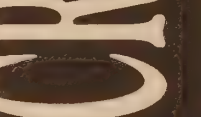

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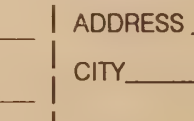

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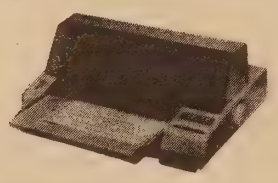

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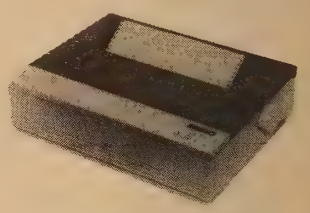

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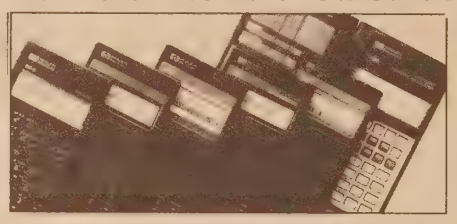

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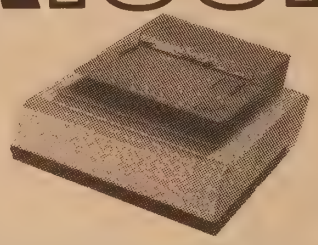

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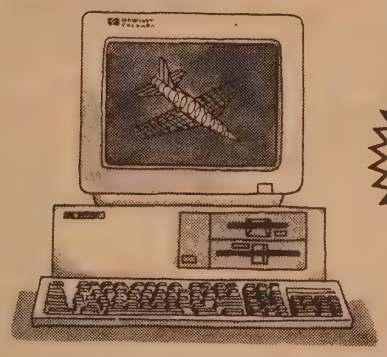

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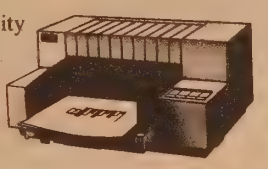

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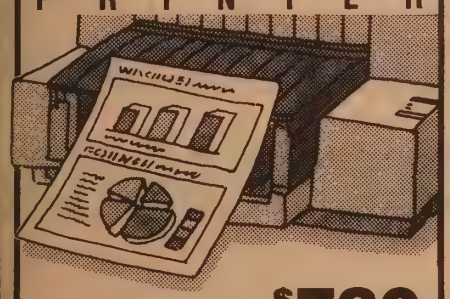

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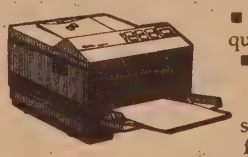

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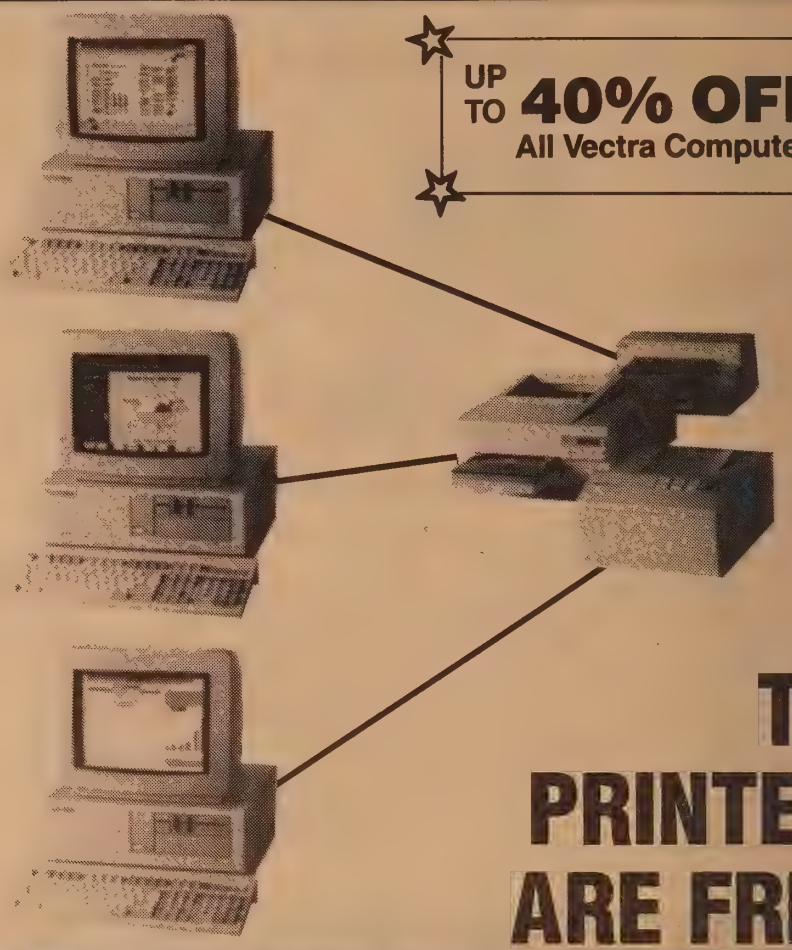

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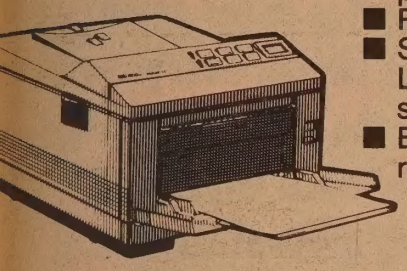

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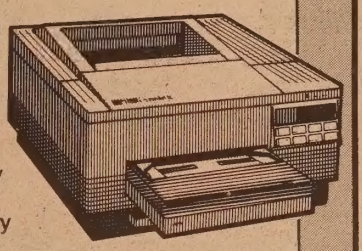

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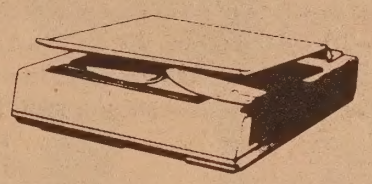

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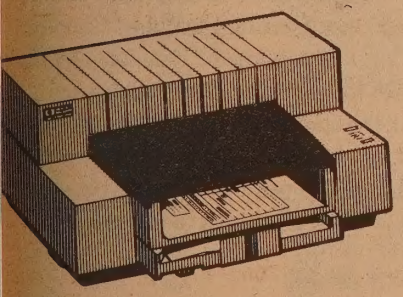

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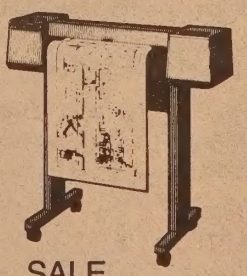

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Is This What The World's Coming To?

If you like good computer columns and like talking about computers, then try the interactive column forums on CompuServe's PC Magnet (go pcmagnet at the ! prompt). Unfortunately many of the good observations and interesting analysis that come and go on the system are never read by the public and scroll off to never-never land. I've collected some recent exchanges between the participants and received permission from Ziff-Davis and PC Magnet to print a few of my favorites.

ON MODEMS

Fm: Raymond Chuang
To: John C. Dvorak
John, not necessarily—remember the good old days when a Hayes 2400 bps modem cost nearly $900? With the price of modems falling as it is, I'll bet even money that a V.32/V.42 bis modem costing less than the $450 suggested retail will be shown at this fall's COMDEX.

Fm: John C. Dvorak
To: Raymond Chuang
I do recall...but I'd still take that bet concerning the $450 modem. Not with V.42 bis it won't be, until 1991's COMDEX.

Fm: Joe Odenweller
To: Raymond Chuang
Raymond, a full V.32/V.42 bis will still be about $1000-1500 by this fall. In our discussions at work we have discussed purchases of new async modems (currently buying 2400 MNP 5) for our access lines, and have decided we should lease all new modems until we switch to V.32/V.42 bis this summer. Our VPA will still have those modems running about $900 this summer. It will take six months to catch up to institutional demand once they are available in volume. Then the prices will drop like a rock (since all engineering costs will have been paid by institutional purchasers). Next spring is when they will be reasonable (about $600).

ON VGA CARDS

Fm: Wick Smith
To: John C. Dvorak
John, one important fact about VGA cards that is seldom reported is how much high memory they need. The V7 VRAM is a nice card, but according to reports here it eats up just about all the high memory you have when run in 16-bit mode. That means you're out of luck if you want to run TSRs and drivers up there in high memory.

If you find a great VGA card, we'd like to hear about its high memory requirements, if those are published somewhere in the docs.

ON AN UPCOMING CONFERENCE IN SAN FRANCISCO

Fm: Ray Gallon
To: John C. Dvorak
The following is the first announcement of the ENA conference in May in S.F. I'd like to post it somewhere in PC MAGNET. Is that permissible, and if so, where would be the most appropriate place? Also, if there's any way of your mentioning it in one of your columns somewhere, that would be appreciated.

Online Announcement
Please port this item or print it out and share it with all your networking friends and acquaintances and those people who should be learning about electronic networking. An online registration form is also available. Call Margaret Chambers, (415)8TO-CONF.

ELECTRONIC NETWORKING ASSOCIATION MEETS IN SAN FRANCISCO, MAY 23-26, 1990
"Online Networking: Collaboration in the Global 90s" is the theme of the fourth face-to-face conference of the Electronic Networking Association which will meet May 23-26, 1990 in San Francisco. ENA is the hub of knowledge exchange about the rapidly advancing collaborative computer-based communication technologies—the technology itself, the impact of that technology on organizations and individuals, and its global potential for productivity and learning.

A phenomenal growth in the use of electronic messaging has occurred in the past five years as users have skyrocketed from 1m to 8.6m with messages exceeding 1.5 billion in 1989. Beyond messaging, another level of group interactive communications offers great possibilities for productivity gains, team and project enhancement, strategic scanning, and consensus building, as well as other benefits for knowledge workers. ENA focuses on these emerging group applications and their impact on organizations.

ENA Online, a computer conferencing and information service to be developed for the meeting, will provide a unique gateway to multiple conferencing, videotex and other online information systems. Available from a bank of computers on-site or from personal computers in the hotel, this network will permit attendees to explore and compare features and advantages of many group communications services. Vendors interested in having their product or service included on the conference system should contact Mark Graham, Pandora Systems, (415)346-4188, online via MCI Mail: Pandora; Internet: mark@Pandora.sf.ca.us.

"John, Novell is in for some rough times ahead. Everyone is jumping on the LAN marketing bandwagon these days. And guess what, most of them are going with LAN Manager stuff, and nobody is going with Novell."

ON LOCAL AREA NETWORKS

Fm: Joe Odenweller
To: John Kevlin
John, Novell is in for some rough times ahead. Everyone is jumping on the LAN marketing bandwagon these days. And guess what, most of them are going with LAN Manager stuff, and nobody is going with Novell.

Fm: Haig Hovaness
To: Joe Odenweller
Have you got any hard numbers to back your assertion that LAN MAN is outselling NetWare? Considering that Novell has a 400 thousand user head start, it will take a while for LAN MAN to make a dent. Personally, I think the chances of LAN MAN besting either Novell or Unix in the server marketplace are slim to none. Microsoft would be well-advised to stop trying to make OS/2 all things to all people on all platforms.

Fm: Mark Cuban
To: Haig Hovaness
Take heart Joe, my experience shows LAN MAN flavors outselling Novell in multi-server and >200 user environments. Remember what Novell says. 400 K NOS, four million users. That's a whopping ten per LAN. That's not the market LM wants.

I think that Novell will always outsell LM in total quantities. Just like MicroSoft Works probably outsells MicroSoft Word in terms of sheer quantities. The question is, whether the sale of lots of NW286 and NW386 ELS can support eight flavors of NetWare and its relations (CXI, Excelan, Kinetics, Softcraft, etc). From the Office of Jeanne Dixon...

Now wait until you hear what these guys think about UNIX, OS/2, IBM and Microsoft! ■

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John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

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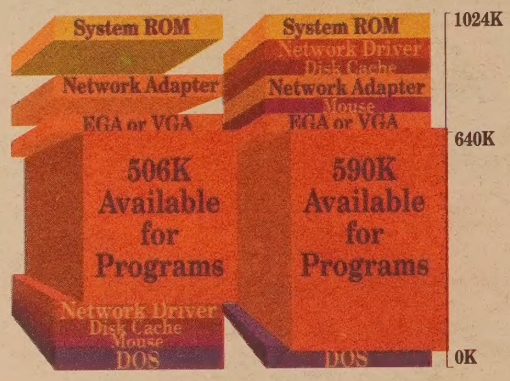

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